SHOULD WE OPT FOR CAPITAL ACCOUNT

CONVERTIBILITY?

AN ANALYSIS

A Thesis

Submitted to the Central Department of Economics,

Tribhuvan University, Kritipur, Kathmandu, Nepal,

in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

in

ECONOMICS

By

KAMAL PRASAD POUDEL

Central Department of Economics

Tribhuvan University, Kritipur

Kathmandu, Nepal

March 2012

Date: 2068/11/19

LETTER OF RECOMMENDATION

This thesis entitled "SHOULD NEPAL OPT FOR CAPITAL ACCOUNT

CONVERTIBILITY? AN ANALYSIS" has been prepared by Mr. Kamal Prasad

Poudel under my supervision. I hereby recommend this thesis for examination by the

Thesis Committee as a partial fulfillment of the requirements for the Degree of

MASTERS OF ARTS in ECONOMICS.

....

Mr. Resham Bahadur Thapa

Lecturer

Thesis Supervisor

Date: March 2, 2012.

Date: 2068/11/28

APPROVAL SHEET

We certify that this thesis entitled "SHOULD NEPAL OPT FOR CAPITAL

ACCOUNT CONVERTIBILITY? AN ANALYSIS" submitted by Mr. Kamal Prasad

Poudel to the Central Department of Economics, Faculty of Humanities and Social

Sciences, Tribhuvan University, in partial fulfillment of the requirements for the

Degree of MASTERS OF ARTS in ECONOMICS has been found satisfactory in

scope and quality. Therefore, we accept this thesis as a part of the said degree.

Thesis Committee

....

Prof. Dr. Rudra Prasad Upadhaya

Chairman

....

External Examiner

Dr. Ram Prasad Gyanwaly

Associate Professor

....

Mr. Resham Bahadur Thapa

Lecturer

Thesis Supervisor

Date: March 11, 2012

ACKNOWLEDGEMENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

LIST OF ABBREVIATION

ADF   :Augmented Dickey-Fuller

AIC   :Akaike Information Criteria

BoP   :Balance of Payments

CAB   :Current Account Balance

CAC   :Capital Account Convertibility

CPI   :Consumer Price Index

CRR   :Cash Reserve Ratio

ECM   :Error Correction Model/ Mechanism

FDI   :Foreign Direct Investment

FI   :Financial Institution

FXR   :Foreign Exchange Reserve

FY   :Fiscal Year

GDP   :Gross Domestic Product

HAC   :Heteroscedascity and autocorrelation- consistent

IMF   :International Monetary Fund

IRs   :Indian Rupees

KAB   :Capital Account Balance

LDC   :Least Developed Country

M2   :Broad Money Supply

MNC   :Multi- national Corporate

MoF   :Ministry of Finance

NER   :Nominal Exchange Rate

NGO   :Non government Organization

NPA   :Non-performing Loan

NPL   :Non Performing Loan

NRB   :Nepal Rastra Bank

NRN   :Non- Nepalese Residents

NRs   :Nepalese Rupees

RBI   :Reserve Bank of India

REER   :Real Effective Exchange Rate

RER   :Real Exchange Rate

ROW   :Rest of the World

SDRs   :Special Drawing Rights

SIC   :Schwarz Information Criteria

US   :United States

VAR   :Vector Autoregression

WTO   :World Trade Organization

FGLS   :Feasible Generalized Least Squares

CHAPTER ONE

INTRODUCTION

1.1. General Introduction

So far as contemporary international trade is concerned, the trend has been to reach capital trading along with current account trading. After Nepal's accession in WTO as 147rd member drastic reforms have been implemented in economic policies since eighth plan (for the duration of 1992- 1997) with the objective of liberal, competitive and market oriented economy. Immediately after ninth and tenth plan taxation, industrial, trade, financial, foreign investment and exchange rate policies have been substantially liberalized. In view of these progressive reforms whether the objectives have been achieved or not are yet to be assessed.

Nepalese economy is almost influenced by Indian economy due to open border that comprises of almost three fourth of its perimeter surrounded by Indian territory, pegged exchange rate policy with India (NRB, 1996), ever growing economy as well as observed gradual hegemony on the region (Pant, 2006; People's Daily Online, 2009; Hanif, 2009). The economic policies, foreign policies and politics of India need analysis to reap advantages as well as get rid of hazards that may evolve due to unpreparedness of Nepalese economy. Further, another ever growing economy of China, whose integration in the global economy is justified with surges in exports and imports (Prasad, 2004) including Nepal should not be underestimated. Considering the possible influences it should also be considered parallel with Indian economy.

Although international trade has been the most important influencing concern for politicians as well as economists, another form of international exchange in the form

of purchase and sale of financial assets- such as bonds, stocks, and derivative contracts are gradually out pacing the traditional trade (Nair, 2006). Whatever may be the form of trade, currency convertibility is the first prerequisite. Currency convertibility refers to the freedom to convert one currency into another internationally accepted currency. There are two forms of currency convertibility- convertibility for current international transactions and convertibility for international capital movements (Cooper, 1996). Government of Nepal has made full convertibility for current account since February 12, 1993 (NRB, 1996) but capital account convertibility (hereafter referred to as CAC) has not been promulgated yet. These signify that companies and Nepalese residents can make receive and payments for the import/ export of goods and services and be able to access foreign currencies for travel, education, medical or other designated purposes. In the same way, foreign currency can be freely converted into Nepalese currency for the acquisition of Nepalese capital assets.

There is no formal definition for CAC, however, with reference to Tarapore Committee CAC is the freedom to convert local financial assets into foreign financial assets and vice versa at market determined rates of exchange. That means home currency can be freely converted into foreign currencies for the acquisition of assets abroad. Thus if CAC regime is implemented in Nepal, we Nepalese can invest, disinvest, or transact in any property or assets/ liability of any country; convert one currency into another or move funds anywhere in the world where there is same regime (i.e. CAC). The transactions are solely based on individual concern and there will not be any restrictions by law.

However, the case of this Capital Account Convertibility is still on debate, not only in Nepal but almost in all the countries that have not followed this regime. It has been hot issue for the developed countries that have been following the regime considering its pros and cons and how to proceed/ implement and control the effects in the future for the benefit of the corresponding country. If attention is drawn towards Nepal's case, what measures to follow based on economic policies that Indian government is obliged to pursue as per their vision/ suitability need confirmation. This is not solely concerned with Indian economy, as market penetration for Chinese products have also been soaring year by year; impacts of policies followed by China should also be in consideration. So the characteristics of growing financial flow need close scrutiny. We need to be prepared for the worst cases considering what might be the economic impacts based on the policies and regulations our neighboring countries will follow (Pyakuryal, 2007).

Before going to the depth of CAC issues, the following basics should be kept in mind;

Capital Account: The capital account is a part of the balance of payments that includes all the purchases and sales of financial claims except foreign exchange reserves, in which one participant in the transactions is a local resident and the other is not. Usually, this account is divided into long- term and short- term segments on the basis of whether asset maturities are more or less than one year. Long- term capital flows include direct investments by multinational firms, purchases or sales of bonds and common stock, as well as loans with maturities of over one year. Short- term capital flows includes money coming into or going out of asset forms such as Treasury bills, commercial paper, and bank accounts, as well as the short- term financing of export sales. The balance of capital account is obtained by subtracting

lending to abroad from receipts from abroad. Now, for an example, if one of the Nepalese company exports its products to India in November with 90-day payment terms, the Nepalese balance of payments (BoP) accounts for that year will show an export (+) in the current account and a short-term outflow (-) in the capital account. During the following year, when payment is received from India for the goods, the Nepalese capital account will show an inflow (+), thus completing the earlier transaction (Jhingan, 2006).

It should be noted that the format of the capital account will be little different for fixed and flexible exchange rate. The IMF uses the phrase 'Financial Account' instead of capital account. According to IMF, transfers linked to the acquisition or disposal of a fixed asset and the disposal or acquisition of non produced nonfinancial assets is used for capital account. Some of this involves situations in which a foreign company has put in place a "build and run" factory or power plant, which is then transferred to the host government at the end of a fixed period. The transfer would be in the newly defined capital account (Dunn and Mutti, 2004).

Current Account: It includes all the international purchases and sales of goods and services (including the services of capital, since dividend and interest payments are included), and its net balance represents the change in a country's net investment position relative to the rest of the world (ROW). The current account surplus means that the country either increased its net creditor position or reduced its net indebtedness by that amount during the year.

Foreign Exchange Reserve: It is the foreign financial assets held by government or central bank which are available to support the country's BoP or exchange rate.

International reserves serve for the countries the same purpose that bank account serves for individuals. They can be drawn on to pay bills and debts, they are increased with deposits representing net export sales and capital inflows, and they can be used as collateral to borrow additional reserves. Cash account or international reserve account includes holdings of gold, the country's reserve position in the IMF, and claims on foreign governments and central banks. These funds are used to finance deficits in the remainder of the accounts, and payments are made into these reserves when there is a surplus in other items.

If a country's Current Account (CA) and Capital Account (KA) sum to a positive number, its Foreign Exchange Reserve (FXR) assets should increase (or its reserve liabilities decrease) by that amount. That is: $CA + KA - \Delta FXR \equiv 0$ must hold true; where Δ shows the changes in corresponding variable. Since increases in the reserve assets (or reductions in liabilities) represent a minus in the payments accounts, the total for all items in the BoP accounts must sum to zero. Due to some statistical discrepancies the equation may not be balanced, so for this Error and Omissions are created as additional element in the BoP so as to keep the identity balanced. Objectives of every country are to facilitate the international transactions through suitable policies that keep the above identity in balanced state as far as possible.

1.2. Aspects of Capital Account Convertibility

It is of utmost importance to evaluate the performance of the current economy before taking any decision for choosing newer liberal policies. In view of this, historical steps taken by Nepal towards the liberalization of economy, probable challenges, merits and demerits for accepting CAC have been explained.

1.2.1. Capital Account Scenario and Prospects of CAC for Nepal

Formally the constitution of Nepal 1990 initiated economic liberalization through the enactment of entry to FDI. For the purpose of national development, policies that pursue necessary background to attract foreign capital and technology have been directed but implicitly promoting indigenous investments at the same time. The Industrial Policy 1992 and Foreign Investment and Technology Act 1992 are the outcomes of directives of Constitution of Nepal 1990.

Before 1991, external sector policies had the following three features;

    i. Strict and rigorous control on the foreign exchange facility to be provided to the general public

    ii. Official recommendation required for most of the purposes for which foreign currency was required and

    iii. Restrictive and regimented commercial import policy under which foreign currency would not be provided at the declared rate until and unless some sort of premium was paid to the government (Forty Years of NRB, 1996).

The reasons behind such above controls were due to the strict nature of exchange rate policy of that period. The exchange rates of convertible currencies used to be fixed by the Central Bank without considering market forces as reflected in demand and supply factors. The demerit for such an arrangement was that exchange rates thus fixed lagged behind the required adjustment resulting in huge premium due to which rigorous control on the distribution of the exchange facility was necessary. The delays in acquiring license for the procurement process and the load of premium for the central bank automatically hindered genuine industrial development.

Considering all these drawbacks, policy for partial convertibility was adopted. The major features of this policy were to allow the market forces to determine the exchange rate of the convertible currencies. Commercial banks could fix their exchange rates as per demand and supply factors. Market exchange rate was applicable to 65% of export earnings at the beginning and subsequently it was increased to 75%. Since all the foreign currency earnings were not allowed to be converted at the market determined exchange rate, this policy was called Partial convertibility (NRB, 1996). Furthermore, import procedures were made open through the policy of OGL (Open General License).

With progressive moves, finally Nepalese Rupees was made fully convertible for the current account transaction after February 13, 1992 (NRB, 1996). This policy allows all the foreign currency proceeds to be converted at the market rates. Up to 100% of earnings of exporters were permitted in their foreign currency accounts. Considering the commercial policy, except for certain specified items, all other goods were included in the OGL import list. However, it should be noted that NRB played supporting and facilitating role so as to maintain proper balance between the domestic interest rate structure, liquidity conditions and external sector transactions. In this process, NRB has been adopting a policy under which intervention in the local foreign exchange market is undertaken as and when required. If intervention by NRB is needed, objectives of exchange rate stability and liquidity management are the main guiding lines.

As observed, gradual progress towards full convertibility of the Nepalese Rupees in capital account is the target. Currently, CAC for NRNs is in beginning phase. Soon NRNs can open account in USD in Nepalese FIs. As per NRB, the main inhibiting

factor to achieve full capital account convertibility is the pace of the reform in India. Though India nearly has been to fuller CAC, we are still behind; which needs identification considering the close economic relationship between India and Nepal. As this economic relationship cannot be delinked, suitable move towards CAC at a suitable time is necessary to prevent any adverse impacts in the economy.

Usually the requirement for the injection of capital is a prerequisite for LDCs like Nepal. Due to lack of sufficient capital investment, economic growth and employment opportunities are already in dilemma. Gap between the gross saving/ GDP and Gross Investment/GDP justifies this scenario. This saving and Investment gap which was -12.8% in FY 2002/03 is increasing year by year. For FY 2009/ 10 it was estimated as -27.6%, however insignificant improvement to negative 23.5% is observed if first eight months' performance is observed for FY 2010/ 11 (Economic Survey, MoF, 2011). This certainly justifies the need for capital requirement for Nepalese economy.

However, the injection of capital should be for productive sectors that generate employment and revenue for the country so far as the economic surveys indicate that the country's economy is gradually turning to consumption oriented due to remittance income. Political instability and lack of consensus among parties regarding core economic plan/ objectives with due consideration to implementation and other factors have resulted uncertainty among people and investors in savings and investment rates. According to MoF, Nepal, consumption to GDP that stood at 88.3 percent in FY 2000/01 has gone up to 93.3 percent by FY 2010/11. As a result, the rate of domestic savings has come down to 6.7 percent from 11.7 percent during this period. Hence, in order to activate economy, it is highly recommended to create the foundation for economic growth through enhancement of saving and investment levels by

discouraging unnecessary consumption. Although foreign employment remains a major source of foreign currency for the country, in the long-run it could fall in the remittance trap that needs to be seriously considered by creating employment opportunity within the country employing youths.

Time has come to assess whether the implication of full current account convertibility has yet to be assessed. Are we able to cope for transactions of bigger amounts in foreign currency without causing any hindrance or instability to the economy? This query is vital before we move for any form of capital account convertibility. As foreign currency is acquired through export of goods and services, it is below par; instead remittance has filled this void. In the absence of investment- friendly environment as mentioned above energy crisis and conflicting labor relations are also the other significant factors that have exacerbated the industrial sector. Coming once again to MoF Nepal statistics, industrial sector's GDP growth rate over past 10 years averaged only to 0.3 percent. Contribution of this sector from 9.0 percent in FY 2000/01 has disappointingly slipped to 6.5 percent in FY 2010/11. Finally, the adverse impact of weak industrial sector that is linked and responsible for external sector ends with continuous trade account deficits. There was BoP deficit in FY 2009/10 for the first time in the previous eight years. Observation of statistics for the first eight months of the current fiscal year reveals continuation of BoP deficit situation thereby gradually depleting foreign exchange reserves. In average the capacity of reserve to cover import for goods was approximately 11 months in the periods of FY 2000/ 01 to FY 2008/ 09. However, in FY 2009/ 10 coverage of import for only up to 8.7 months was reported. The trend appears to be declining or limit to the previous level. In order to cope up such deficiencies of the economy, there is the

need of promoting exports through effective implementation of the Commerce Policy, 2009; and Industrial Policy, 2010. In addition, promotion of export oriented industries, identification and market promotion of export potential items and enhancing the competitiveness of such goods is equally vital. Besides, improving the slipping export trade by promoting the export of the Nepal Trade Integration Strategy, 2010 identified goods and services is of utmost necessity.

Human labor export is gradually becoming the major source of foreign exchange earnings and sustaining the positive BoP. Therefore, it is necessary to make this sector more systematic and take additional initiative for the flow of remittance through the formal channel. The challenge necessarily lies in making institutional arrangement for providing training and skill to raise demand for Nepalese labors at the international level, and guide the flow of remittance to the productive sector.

As far as the move to capital account convertibility is concerned, the emphasis on improvements of financial sectors/ institutions and financial deepening has been identified as crucial prerequisites. Concerning financial deepening of Nepal gradual improvement has been recorded. However, the financial institutions are urban centric thereby lacking coverage to all the territories within the country. In comparison with the number of FIs during 1990s, when there were only four financial institutions, now outstanding progress is observed with current number of FIs as 277 according to Banking and Financial Statistics, NRB as of Mid January 2011. Among them 30 are commercial banks, 87 development banks and 79 finance companies. Remaining are 21 micro- finance development banks, 15 saving and credit cooperatives and 45 NGOs (financial intermediaries).

When the performance of FIs are taken as the benchmark, statistics show higher NPAs (or NPLs), which need significant improvement for the betterment of economic performance. But it is interesting to note that the trend of improvement is indicated by declining NPL to gross loan ratio year by year. If the same for Commercial, Nepal Bank Limited, and Rastriya Banijjya Bank (RBB) are compared, the best performance is observed for commercial banks then followed by Nepal Bank Limited. As of data by NRB, Mid January 2011, RBB NPL to gross loan is significantly higher (12.37%) but with great improvement in comparison to 60.15% in 2003. Except Nepal Bangladesh Bank and Agricultural Development Bank all other commercial banks have the ratio of less than 5%.

With some current news regarding policy promulgation on the benefit of NRN (Non Resident Nepalese) those NRNs can invest in Shares and Equities in National Financial Institutions (FIs), once again after two decades discourses have heightened regarding Nepal's move towards capital account convertibility. With Asian financial crisis that was observed during 1997, which were thought to be the result of sudden move towards capital liberalization without sufficient preparation, those countries which have made up the mind slowed down for preparation. This not only happened in Nepal, but India and China also did not prompted for action towards their economic reform just focusing capital account liberalization. Keeping in view the negative impacts, reform in financial sectors, improvements in industrial sectors to seek financial as well as economic stability were given the topmost priorities.

If the economic indicators of India and China are considered, they are quite progressive and stable. Referring to the World Economic Outlook series data of IMF from various issues, GDP growth are in increasing trend though with some deviations

after the 2008 due to effect of Subprime crisis of 2007. The growth rates of 9.6 and 9.1 for China for 2008 and 2009 respectively whereas the corresponding values are 6.4 and 5.7 for India. Further, considering the projections up to 2011 for both the countries (10.5 and 9.6 for 2010 and 2011 respectively for China and the corresponding values of 9.7 and 8.4 for India), justifies that the economies are moving healthily. However, if the same thing is considered for Nepal after degrading performance of 0.1 percent in 2002 due to conflict, it is slowing taking pace. But on comparison to the decades of 1990, the growth doesn't seem significant.

Though due to unique geographical location in between only two countries, two third of perimeters surrounded by India and remaining with China, crisis seem to have been insulated due to their relatively outstanding performances. China and India's partial liberalization in the world economy and Nepal's economy being mainly exposed to these neighboring economies especially in higher extent with Indian economy can also be the other reason. Further, stagnant share of industrial activities resulting unfavorable trade term with trading partner countries has spurred devitalizing effects. On contrary, share of import to GDP is increasing whereas the share of export to GDP is decreasing thereby increasing trade deficits as justified by more than 28 percent of GDP in FY 2000/01 increasing to 32.2 percent of GDP in FY 2010/11, which is not favorable for Nepal. If export is compared with FY 2000/01, share of export in GDP has drastically reduced from 15.8 to nearly half (8.5 percent of GDP) in FY 2010/11. In the same way, rate of inflation continued to remain high in the current fiscal year. The rate of inflation has moved up to two digits (10.7) from average of 4% increases around early 2000s, indicating dearer life day by day and unreasonably lower real interest rate on capital.

Finally, to conclude this section a recent thought and experience shared by governor of RBI, Dr. D. Subbarao at NRB premises on his visit that "the price stability and macroeconomic stability do not guarantee the financial stability" has so much to warn for any move to capital liberalization. So, micro-prudential supervision is necessary for every central bank to maintain financial stability. However, micro-prudential supervision is necessary but not sufficient. It needs to be supplemented by macro-prudential oversight. As briefly explained above, to cope up with the weak economy that is lacking capital investment especially through the contribution of government, special attention is necessary towards curbing unproductive recurrent expenditure and enhancing productive utilization of development expenditure.

1.2.2. Benefits of Capital Account Convertibility

Usually benefits depend on the size of the economy, market scopes and extent of liberalization. If the purpose is for real economic activities like industrial, agricultural and other important productive sectors, it will have positive impacts like increase in employment level and poverty reduction. However, if it is just for speculation and investment in stock markets it will not have any positive influence on the economy (Paudel, 2009). The following benefits can be summarized;

-Inflow of FDI

-Financial innovation with integrated developed world in a low cost of liberalization

-Flow of technology and intellectual property

-Stabilization of economy through diversification

-Deepening of the domestic financial system

-Allocation of resources to the most productive areas

-Improves macroeconomic discipline

-Promote domestic investment and growth

-Penalize bad policies for correction

-Increase banking system efficiency and financial stability

-Increase the degree of efficiency of financial system by lowering the cost and making more profits

1.2.3. Costs of Capital Account Convertibility

Usually there will be massive risks if CAC is promulgated without fulfilling prerequisites like macroeconomic stability, strengthening of financial system, proper exchange rate management, etc. Internationalization of FSS brings both 'benefit and cost' where benefits are potential in the long run but the costs are immediate. Thus, an ad hoc approach to CAC without preparation can even lead to extreme instability of economy followed by sufferings to common citizen. There will be chances to fall in crisis due to inability to withstand huge flows of capital (especially short-tem flows of capital) as was observed in crisis in East Asian Economies (India, South Korea, Malaysia and Thailand), Latin American Countries (Mexico, Brazil, Argentina), Russia, and Turkey around 1990s. The Mexico crisis of 1994-95, East Asian Crisis of 1997, Brazilian crisis of 1998-2000 and Turkey's crisis of 1993-94 were entirely due to capital account convertibility, which spread to other developing countries too.

However, it is noteworthy that India being not following CAC regime and China being operated under closed economy escaped the Asian Financial crisis. Finally, as Nepalese economy is influenced in greater extent with activities in Indian economy and to some extent to Chinese economy, it happened possible to escape the crisis. In view of history and experience with other countries, risks that Nepal may need to suffer on transition as well as full- fledged implementation of CAC can be summarized as under;

- Difficulty in maintaining overall macroeconomic stability

- The problem of overbanking and unfair trade practices. For example the more the banks, more will be the cost and difficulties to regulate and supervision for NRB. On the other hand more players in the same market increase unhealthy competition. Nepal is facing the problem of overbanking in urban areas, even before internationalization. Hence, after opening the sector, it would increase further.

- Difficulty in managing reserve and risks related to exchange rate for Nepal Rastra Bank

- Difficulty for small and medium financial institutions to survive due to entry of larger and experienced foreign financial institutions

- Difficulty in predicting and managing financial volatility. Capital (financial) mobility being higher in international market in speculative terms, there are chances of shifting from country to country in the search of higher speculative returns. This has solely remain the cause for financial crisis, which will certainly be the most prominent risk factor for developing county like Nepal

- There may be chances of having difficulties in pursuing effective sterilization policies. Inflationary pressure may increase, current account deficit may grow and unintended appreciation of real exchange rate disrupts export.

- Possibilities of misallocation of capital inflows to unproductive sectors like real estate and stock markets investment. Further, exchange rate appreciation diverts resources from tradable to non- tradable sectors like housing, hotels, tourism, construction, etc.

- Chances of capital flight from Nepal due to poor performance of economy and instability in politics.

- Effect of myopic and naïve behavior, one of the most critical psychological phenomenon as mentioned in so many literatures by economists that either enhances further flight of capital as observed in South Asian Economies' crisis or the behavior that people just keep on hoarding the assets they have without investing.

1.2.4. Challenges for Capital Account Convertibility

Since the objective of the economy is to transform to CAC regime with least risk and hazards and maintain stability thereafter, it is preferred to follow the gradual approach as recommended by India Tarapore Committee (Pant 2007; Pyakuryal, 2007), which is very realistic for developing country like Nepal. Prior fulfillment of important prerequisites like macroeconomic stability, fiscal consolidation, exchange rate management, financial deepening of the economy, etc are the primary steps.

-CAC should be undertaken when the macroeconomic, financial and exchange rate policies are in order. Liberalization of outflows and inflows need to be conducted in a balanced manner so that the pressure on exchange rate and money supply could be minimized (Pant, 2007)

-Efforts must be made to bring exchange rate of Nepalese rupee *vis-à-vis* Indian rupee to a realistic level to make CAC sustainable. However, an *ad hoc* shift from a fixed

regime maintained for a long period of time to market determined regime could create disturbances in the foreign exchange market.

-Nepal has not yet assessed properly the pre-conditions for CAC such as the progress and impact of fiscal consolidation, the strength of financial system, predictability of foreign exchange reserves, problems in sustaining the GDP growth and difficulties in maintaining inflation. No satisfactory homework has been done to also find out if relaxations on current account transactions have contributed to any flight of capital. Despite the fact that Nepal's balance of payments and reserve position is better, overall economic fundamentals are very weak (Pyakuryal, 2007).

-The capability of regulatory institution is not sufficient enough to minimize the pressure on exchange rate and money supply in the event of unrestricted outflows and inflows of both domestic and foreign capital. In practice, because of the political instability, the NRB Act 2002 has not guaranteed the role of the central bank as an autonomous monetary authority. Our experience shows monetary policy has insignificant role in facilitating economic growth. For example, the changes in CRR and bank rate to handle the fluctuations in the liquidity are influenced by political considerations rather than from standard monetary policy perspective.

-Much often efficient resource allocation (capital, technology, etc) are advocated, however, what about the relocation of experienced local personnel who have higher experienced. They may be pulled by strong international FIs for their purpose with high pay thereby leaking internal strategies of national FIs. Price war for pulling experienced staff may benefit few people but as a whole, national financial institutions get hampered.

-It is not always sure that big investors come to Nepal. Usually the trend in global economy is observed that the big investors seek for big markets and target bigger

corporations. So far as our economy is concerned, our small economy cannot provide the base for bigger global investors.

-Ever observed declining political consensus regarding general long term economic strategies, henceforth, implementation is severely lacking and lagging in spite of some initializations (like many Hydro projects, Irrigation projects, etc)

-Usually employment is also thought to improve and much of the profit/ salary earned from citizens will increase. However, this will not be as much significant because higher level staff hired will be much from the foreign country with much higher remuneration, finally, that will expatriate to their home country.

1.3. Statement of the Problem

The trend of economic globalization and liberalization that was noticed rush after 1990, every economies developed, developing or under- developed have witnessed ever increasing and tremendous volume of international trade. On contrary to the traditional type of trades and production, many new and sophisticated techniques of production as well as diversification of products and services can be observed. Every element related with production and trade are gradually turning mobile thereby producing the contradiction with traditional trade theories almost all of which assumed labor and capital as immovable. Now the time has come for everything to go beyond the horizon seamlessly. And CAC can also be taken as a step towards liberalization of the economies, which, when time comes, everybody should participate either willingly or forcefully just to adapt to the environment.

In view of these phenomena, to move along the unstoppable trend of liberalization, the following issues need scrutiny so that our economy can either avert the economic

hazards, prevent from being indulge into crisis or minimize any would be economic damage before it can severely affect. Basically this study focuses on the feasibility of CAC promulgation with reference to the influences of variables capital account balance, current account balance and foreign exchange rates upon each other. Due considerations have also been given to the current trends in international reserve and real economic scenario of exchange rate system in Nepal. In brief, whether to opt for CAC or not is the issue need to be resolved considering the current economic status of Nepal.

1.4. Objective of the Study

The major objective is to find out whether we are in position to follow CAC or not. However, its specific objectives are;

1. To present the time series analysis of interdependence between capital account balance, current account balance and real effective exchange rate in Nepal

2. To examine the foreign exchange reserve trend

3. To examine the economic scenario of exchange rate of Nepalese currency with Indian currency

1.5. Significance of the Study

Considering gradually changing economic trends, CAC can be treated as a means to realize the potential of the economy to the maximum possible extent at the least cost. Given the huge investment needs of the country and inadequate domestic savings to

meet CAC, inflows of foreign capital become imperative. And if the events of Asian crises are considered, inflow and outflow of capital needs some form of control.

The study being made is directly related to the Balance of Payment (BoP); influence of external economy will come in effect. Furthermore, considerations being included to get the possible current trends in international reserve and real economic scenario of exchange rate system in Nepal; empirical finding can provide suitable policy guidelines. So it can be assured that this study will benefit all the researchers related to similar kind of studies, Government of Nepal, Nepal Rastra Bank, for academics, and all those who are interested in the related topics.

1.6. Limitations of the Study

It is known to all that currently Nepal government allows currency convertibility for current account only. To study its impact we can get at least secondary data, however, CAC has not been implemented yet and it's still an issue when and/ or how to go for it. So for the time being it is not possible to get required statistical data for the case of Nepal. However, the study has been carried on using relevant secondary data. In summary, the following limitations may have chances of getting incomplete and twisted results;

1. Policy implication and its implications will be somehow different at the time of implementation as people, business people and others related always try to seek safeguard their motives. This will create discrepancy of actual economic activity with observed statistical data. So the data considered may not be accurate as what it should be.

2. Data of all the influential variables cannot be obtained as well as cannot be included in the model. Data mining, for e.g. rounding of decimals might have slight deviation.

3. Due to open border and many illegal transactions, some error will always be there in the related statistical data.

4. Objectives of government may be different than what was considered in the study.

1.7. Organization of the Study

What should be the conditions prior and post to the capital account liberalization are the main concerns of this study. The report has been organized in the following manner. The first chapter will provide the introduction of CAC followed by the prospects for CAC for Nepal, its merits, demerits and challenges. Then, the statement of the problem, objectives of the study and limitations of the study will follow. Second chapter will elaborate Literature reviews to include the opinion of economists who have tried to delve in the depth of CAC. Some important literature reviews on international reserves and exchange rates are also included.

The research methodology that explains the selection of variables and appropriate econometric tools, nature and sources of data are included in third chapter.

Chapter four covers the output of all the empirical strategies and their analysis. Finally, conclusion and policy implications or recommendations will end the report.

CHAPTER TWO
LITERATURE REVIEW

Though some form of Capital Account Liberalization has been found practiced in early 1990's in developed countries, CAC was first coined as a theory by Reserve Bank of India in 1997 by Tarapore Committee. The committee's effort was to find out the fiscal and economic policies that would enable developing (Third World) countries to adapt to the globalized market economies. Theoretically, for CAC, assets are required to flow in both directions freely. From the experiences, it has been observed that Capital Account Liberalization has enabled increment in investment. On the contrary it has also eased quick liquidation and removal of capital assets from both the domestic and foreign country. So, some form of restrictions rather than free flow as advocated by developed countries need close scrutiny.

To specify, it is difficult to obtain the definition for CAC. However, as its theoretical concept was coined by Tarapore Committee, CAC refers to the freedom to convert local financial assets into foreign financial assets and vice versa as per the definition by the committee. It is associated with changes of ownership in foreign/domestic financial assets and liabilities and embodies the creation and liquidation of claims on, or by, the rest of the world. CAC can be, and is, coexistent with restrictions other than on external payments. Simply, CAC would mean freedom of currency conversion in relation to capital transactions in terms of inflows and outflows. This definition is just an analogy to the definition of Current Account Convertibility, which means freedom in respects of payments and transfers for current international transactions.

IMF puts an obligation on a member to avoid imposing restrictions on the making of payments and transfers for current international transactions, however, members may

cooperate for the purpose of making the exchange control regulations of members more effective (Article VIII of IMF). Further, the member countries can exercise such controls that are necessary to regulate international capital movements, but not so as to restrict payments for current transactions or which would unduly delay transfers of funds in settlement of commitments(Article VI(3) of IMF).

Tarapore Committee's study prevails that the cross-country experience with capital account liberalization suggests that countries do retain some regulations influencing inward and outward capital flows including those which have an open capital account. The 2005 IMF Annual Report on Exchange Arrangement and Exchange Restrictions shows that while there is a general tendency among countries to lift controls on capital movement, most countries retain a variety of capital controls with specific provisions relating to banks and credit institutions and institutional investors. Even in the European Community (EC), which otherwise allows unrestricted movement of capital, the EC Treaty provides certain restrictions.

Some literatures support that free capital account in the context of global integration, both in trade and finance, economic growth and welfare can be found enhanced. However due to some unpredicted (or neglected?) changes and experiences of emerging market economies (EMEs) in Asia and Latin America which soaked in currency and banking crises in 1990s, some changes on the perspective of CAC have been noticed. The costs and benefits or risks and gains from capital account liberalization or controls are still being debated among both academics and policy makers. It's been argued that while there are economic, social and human costs of crisis, extensive presence of capital controls when an economy opens up the current

account creates distortions. Capital control just makes them either ineffective or unsustainable. These developments have led to considerable caution being exercised by EMEs in opening up the capital account. The link between capital account liberalization and growth is yet to be firmly established by empirical research. Nevertheless, the mainstream view holds that capital account liberalization can be beneficial when countries move along with a strong macroeconomic policy framework, sound financial system and markets supported by prudential regulatory and supervisory policies.

While elaborating the Indian approach to CAC, three preconditions that need to be met over three year period from 1998 after finalization of Tarapore Committee have been identified as;

i. Reduction in the gross fiscal deficit of the central government from 5% of GDP to 3.5 %

ii. Inflation rate not to exceed an average of 3 to 5% over the three years

iii. Reduction in the cash- reserve ratio of banks from an average effective rate of slightly more than 9% to 3% and a reduction of the gross non-performing assets of the banking system from about 17% to 5%.

Among these prerequisites, reduction in the nonperforming assets of the banking system has been recognized as the most difficult condition to meet (Tarapore, 1998). To achieve the objectives four attendant variables- the current- account deficit, the real effective exchange rate monitoring band, the foreign exchange reserve and the financial system have been considered as the most significant variables (ibid). These points clearly pinpoint the need for strengthening the financial system to deal with increased competition as the most important prerequisite for CAC. Failure to make

the necessary adjustments to these factors could jeopardize the entire process towards capital- account liberalization.

On regard to capital account liberalization, lest the fearful perceptions raised by Asian crisis caused due to liberalization in capital flow, Stanley (1997) persuades that the potential benefits of liberalizing capital account outweighs the costs. For this countries need to prepare well for capital account liberalization- they especially need to adapt their policies and institutions, particularly financial systems. However, he favors IMF either to amend or add new clauses for the member countries to help ensure that capital account liberalization is carried out in an orderly and non-disruptive ways that minimize associated risks.

For the efficient use of scarce resource- capital in the world and if private property right of an individual is concerned (s)he should be free to dispose her/ his income and wealth based on their evaluation provided that it will not hamper other's right and the parties involved get profit (Cooper, 1998). Cooper has drawn conclusion that except in large and diversified countries with well- developed and sophisticated financial markets, free movements of capital and floating exchange rates are basically incompatible. Also free movements of capital are incompatible with fixed exchange rates but compatible with adjustable exchange rates. Thus unless countries are prepared to fix the values of their currencies permanently to a leading currency, or to adopt a leading currency as their own national currency, they may reasonably choose to preserve the right to control at least certain kinds of capital movements into and out of their jurisdictions (ibid).

It can be thought that CAC is the natural follow up to the current account convertibility. It must have been the thought that if international trade of goods and services without any barrier is beneficial, then why not go for the freedom on financial and physical assets' trade? However, the analogy in current account and capital account is found misleading from experiences. Markets for goods and services operate in most instances with some sort of efficiency and predictability but financial markets do not. Financial markets are prone to asymmetric information, incompleteness of contingent markets and bounded rationality (Rodrik, 1998 and Bhagwati, 1998). Similar remarks for the consequences of the failures which are common among economists like Schneider (2000) and Rodrik (1998a) can be summarized as under;

• Tendency for excessive lending for risky projects due to asymmetric information that is combined with implicit insurance;

• Tendency of mismatch between short- term liabilities and long-term assets that leaves financial intermediaries vulnerable to bank runs and financial panic. This type of problem is particularly severe in cross- border transactions where there is no international lender of last resort;

• When markets cannot be observed as thought by money managers (investors), these managers are likely to place too little weight on their private information finally exhibiting the herd behavior. This behavior, in turn, results in excess volatility and contagion effect;

• Because asset values are determined by expectations about future returns, the dynamics of asset prices can be quite rich exhibiting bubbles

Rodrik (1998a) concludes by mentioning two significant risks that could evolve while following CAC – first, increase in the liquidity to which borrowers in individual

countries have access greatly magnify the effects in the market sentiments and second, increase and transfer the systematic risks through contagion from one market to other.

With due consideration for exchange rate system and reserve requirement almost in all of the influential literatures by Tarapore (1998), NRB (2000) , Schneider (2000), Jadhav (2003), Ho-Don (2005), Nair (2006), Pyakuryal (2007) and so on important literatures have been reviewed onwards. Usually studies on exchange rate regime are found to argue on the appropriateness of regime. In the same way, adequacy and/ or the level of reserves and risks for holding them are found to be discussed. Here, dependency of reserves being on exchange rate too, first exchange rate literatures have been reviewed.

It seems clear that whatever exchange rate regime a country pursues, long-term success depends on a commitment to sound economic fundamentals—and a strong banking sector (Caramazza and Aziz, 1998). Reason behind moving to flexible/ basket approach is due to appreciation of pegged currency and rapid increase in inflation in developing countries in relation to the main trading partner. Inflation caused developing countries to depreciate their currency to main trade competitiveness.

Recent growing trend towards flexible exchange rate seems to be devised for open, outward- looking policies on trade and investment with much emphasis on market-determined exchange rates and interest rates. However, practically due to small and thin financial markets, implementation of flexible exchange rate is difficult for

developing countries like Nepal because few large transactions can cause extreme volatility. This requires active management to help guide the market.

The early literature on the choice of exchange rate regime took the view that the smaller and more "open" an economy (that is, the more dependent on exports and imports), the better it is served by a fixed exchange rate. A later approach to the choice of exchange rate regime looks at the effects of various random disturbances on the domestic economy. In this framework the best regime is the one that stabilizes macroeconomic performance, i.e., minimizes fluctuations in output, consumption, the domestic price level, or some other macroeconomic variable. The ranking of fixed and flexible exchange rate regimes depends on the nature and source of the shocks to the economy, policymakers' preferences (that is, the type of costs they wish to minimize), and the structural characteristics of the economy.

In general, a fixed exchange rate (or a greater degree of fixity) is preferable if the disturbances impinging on the economy are predominantly monetary—such as changes in the demand for money—and thus affect the general level of prices. A flexible rate (or a greater degree of flexibility) is preferable if disturbances are predominantly real—such as changes in tastes or technology that affect the relative prices of domestic goods—or goods originated abroad.

Until recently, most evidence suggested that developing countries with pegged exchange rates enjoyed relatively lower and more stable rates of inflation. In recent years, however, many developing countries have moved toward flexible exchange rate arrangements—at the same time as inflation have come down generally across the

developing world. Indeed, the average inflation rate for countries with flexible exchange rates has fallen steadily— to where it is no longer significantly different from that of countries with fixed rates. The perceived need for greater flexibility has probably resulted from the increasing globalization of financial markets—which has integrated developing economies more closely into the global financial system. This in turn imposes an often strict discipline on their macroeconomic policies.

Trade-offs exists between fixed and more flexible regimes. If economic policy is based on the "anchor" of a currency peg, monetary policy must be subordinated to the needs of maintaining the peg. As a result, the burden of adjustment to shocks falls largely on fiscal policy (government spending and tax policies). For a peg to last, it must be credible. In practice, this often means that fiscal policy must be flexible enough to respond to shocks.

As much reiterated, movement toward full capital account convertibility, however, can succeed only in the context of sound economic fundamentals, a sound banking sector, and an exchange rate policy that allows adequate flexibility. Greater exchange rate flexibility need not imply free floating. It may, for example, involve the adoption of wider bands around formal or informal central parities and active intervention within the band. The greater the role of fiscal policy—in helping to adjust the economy to changing conditions—the less the need for wider bands or large-scale intervention. Nevertheless, exchange rate adjustments may be needed at times. Under any regime, appropriate and transparent economic and financial policies are critical for safeguarding macroeconomic stability. They may not, however, always be sufficient to prevent exchange rate volatility (Caramazza & Aziz, 1998).

Nepal is following dual exchange rate policy, fixed with India and flexible with other countries. At the present situation of dual exchange rate policy CAC, fixed exchange rate regime and independent monetary cum fiscal policy do not go together if the theory of impossible trinity by Mundell- Fleming is considered. According to the Mundell- Fleming model a small, open economy cannot achieve all three of these policy goals at the same time: in pursuing any two of these goals, a nation must forgo the third. The experience of other developing countries depicts that CAC would not be sustainable, if exchange rate is pegged (Sigdel, 2007).

Further consideration as reflected from the study of the relationship between REER and GDP on the Nepalese economy by Thapa (2008), there exists two channels of transmission for the real exchange rate to affect economic activities- the aggregate demand channel and the aggregate supply channel. The traditional view has it that the real exchange rate operates through the aggregate demand channel. This means that the depreciation of the real exchange rate enhances the international competitiveness of domestic goods, boosts net exports and eventually enlarges GDP. The aggregate supply channel, on the other hand, purports that the depreciation of the real exchange rate increases the cost of production and helps redistribute income in favor of the rich. These two effects lower aggregate demand causing economic contraction. The empirical study shows that the traditional view holds for Nepal and implies that Nepal should at least keep the real exchange rate constant.

Upon delving into view of Rodrik (2008b) , he has clearly associated overvalued exchange rate with shortages of foreign currency, rent-seeking and corruption,

unsustainable large current account deficits, BoP crises, and fluctuating macroeconomic cycles. Certainly all of these are damaging to the economic growth. On contrary, just as overvaluation hurts growth, undervaluation facilitates it. These have been substantiated with the high- growth periods of most countries that were associated with undervalued currencies. Much of the statistics have proved to have linearity relationship between a country's real exchange rate and its economic growth. However, Rodrik has affirmed that this relationship holds only for developing countries; it disappears when tested with richer countries. The relative price of tradable to non- tradable (the real exchange rate in another way) seems to play a more fundamental role in the growth process. In the conclusion he has recommended a more practical approach which is to subsidize tradable production directly, rather than indirectly through the real exchange rate. The direct strategy of subsidizing production of tradable is achieved without spillovers to other countries, which should be the main point. A production subsidy on tradable boosts exports and imports simultaneously.

Broda (2000) found that real GDP growth responses and the time path of the real exchange rate are significantly different across exchange rate regimes. In response to negative terms of trade shock, fixed regimes have large and significant losses in terms of real GDP growth and their real exchange rate begins to depreciate after two years. Flexible regimes, on the other hand, are associated with small growth losses and immediate large real depreciations. Negative shocks are inflationary in floats and deflationary in pegs, though differences are not always significant. The picture that emerges is consistent with the conventional wisdom that flexible exchange rate regimes are able to buffer real shocks better than fixed regimes. For developing and

emerging Asian economies, the choice of regime does affect the economic growth rate. Non- linearly managed float outperforms other regimes – but do not affect the variability of growth (Huang and Malhotra, 2004). Their findings suggest that how the choice of exchange rate regime affects economic growth critically depends on the level of development of that economy.

The choice of exchange rate regime on the basis of these factors requires complete information on their status, and does not depend on one factor alone. Furthermore, it also depends on the policymakers' objectives. If the objective is inflation reduction, then usually a fixed rate regime is the choice. However, if the objective is correcting external balances, then exchange rate flexibility is the choice. If all factors are given equal weights, the outcome of choice between fixed and flexible regime may be decided in favor of the latter.

Currently observed inflationary trends (higher inflation) in Nepal, needs to be known whether it is due to exchange rate or not. If it is not due to exchange rate (or only if influences is in smaller percentage), then the following may be the cases;

 i. Whether NRs is appropriately valued: For this we need to consider CAB (of which trade is a significant portion). If the view of Ishfaq (2010) that for non-oil producing countries, CAB as a percentage of GDP is close to zero then the exchange rate is generally considered to be appropriately valued is supposed. However, deviation from fair value may persist for extended periods. Further, generally, larger deficits would indicate overvaluation and larger surpluses undervaluation of the economy's currency versus trading partners' currencies.

ii. Whether the currency regime is appropriate: The argument for the use of the IRs as an anchor currency is essentially based on the trade profile of the Nepal (with significant transactions being involved with India and remaining involving transactions in other currencies). In general terms, the currency choice in a fixed exchange rate regime is important in order to avoid a situation where the local currency gains in value significantly vis-à-vis its major trading partners‘ currencies thus hampering exports and enlarging imports volume, which is obviously more critical for countries running current account deficits like Nepal. The prolonged CAB deficits faced by Nepal should be due to poor export diversification and export of relatively elastic products.

Now moving on to the international reserves, management of reserve is a vital aspect of macroeconomic policy. With ever increasing liberalization/ movement of capital, there are similar chances of facing vulnerabilities leading to crisis. For this holding sufficient amount of reserve may be good idea to combat uncertain excess reversal of capital flows, however, at the same time holding large levels of reserves may cost an economy as investment opportunities will be lost and repayment of external debt a country incurred with ROW keeps on increasing. However, it's been often felt that authorities care much about cost of crisis resulting from currency depreciation as well as the consequence of substantial loss of output after currency crisis (Chakravarti, 2008 and Frenkel, 2005). Besides these, the objective behind holding reserve are also to provide insurance coverage to counter the resulting risk perceptions of the economy as a result of unfavorable politics, to smoothen inter temporal tax burden especially at the time of adverse productivity shocks usually observed in developing countries. Holding reserve may also be for a reasonable investment strategy when the values of

foreign currency assets are negatively correlated with that of domestic investments (Choi, Sharma & Stromqvist, 2007).

From an economic viewpoint, it makes sense that developing countries hold most of the reserves, even though their economies are not the largest ones. Industrialized countries have more stable currencies, diminishing the risk of currency depreciations. Furthermore, they have more access to capital markets, making borrowing easier and cheaper than holding reserves. Nonetheless, there is an ongoing debate about whether or not large holdings of international reserves are beneficial for a developing country. Those who argue against large reserve holdings point out the investment opportunities available in developing countries that are usually rich in foreign reserves. Clearly, large reserve holdings represent a huge social opportunity cost. However, investing those reserves would bolster the money supply and increase inflation. Another argument against holding large volumes of reserves is the enormous financial opportunity cost of holding those reserves. Not only is money not being used to develop the country, but it is earning virtually no return.

Reserves are usually held as short-term investments in order to guarantee their liquidity, so earning is of very low interest rates. Therefore, the foregone return of foreign reserves is very high. Overall, the literature offers no definite conclusion on the net gain or loss associated withholding reserves. As for explaining the current reserve hoarding in Asia, several arguments have been set forth. One argument is that reserves are a by-product of the countries' exchange rate regime. Another theory suggests there is a precautionary motive behind reserve hoarding, suggesting that countries are insuring themselves against financial crises (Aizenman and Marion,

2002). Yet another possible explanation suggests that high level of reserves are a consequence of Asian countries' mercantilist desire to keep their real exchange rate devalued against the dollar to bolster the domestic economy (Flood and Marion, 2001).

In a comparative study between factors affecting foreign currency reserves in China and India, Romero (2005) has examined the effect of different exchange rate regimes on reserve holding. The accumulation of foreign exchange reserves in India is best explained as a function of exchange rate volatility and the degree of openness of the economy. The impact of one-time shocks, such as currency evaluations, and structural shocks, such as trade liberalization, are captured in the estimating equation. However, the factors driving the accumulation of foreign exchange reserves in China remained as puzzle.

Under a fixed exchange rate system, reserve holdings are expected to be larger, since they are necessary to maintain the exchange rate stable. Although the nominal exchange rate is fixed, the market can still affect the real exchange rate. The central bank might find it necessary to use reserves or other monetary tools to maintain the peg. Simultaneously, a fixed currency can be subject to speculative attacks. Large reserve holdings would be necessary to counteract those attacks. Therefore, under a fixed exchange rate system holdings of reserves are expected to be larger, since they are needed to maintain the fixed exchange rate stable. Countries with a flexible exchange rate are not expected to maintain a currency peg, so requiring fewer amounts of foreign exchange reserves. These countries will still hold reserves, since they are important monetary tool and a means to self-insure against major financial

crisis. However, their reserve holdings should be capped at some optimal level in order to avoid the cost of holding excessive reserves. Keeping the above consents, central banks are generally thought to hold stocks of foreign reserves in order to stabilize their exchange rates through intervention in the foreign exchange market. Unchecked exchange rate instability would translate into internal imbalances (Batten, 1982).

Usually if the evolution towards study for the determinants that influence the magnitude of international reserves is observed, almost most of the literatures share common views. Most of the studies base theories developed in 1970s and 1980s with some modifications. Frenkel, in his 1978 seminal paper, argued that the marginal propensity to import (MPI) measures an economy's openness to external shocks, and therefore would be positively related to foreign currency reserves if the reserves were held as a precautionary measure. Frenkel measured a country's MPI as the ratio of imports over GDP. His study concluded that "optimal reserve holdings would increase as the volatility of reserves increased." His empirical study showed that volatility of reserves is indeed a robust predictor of foreign reserve holdings. Building from this argument, a precautionary theory of international reserve demand developed. This model proposed that reserves are held as self-insurance against financial crisis.

This explanation drew directly from the buffer-stock argument. The buffer-stock theory argued that reserves are financial stocks accumulated in times of abundance and are depleted in times of scarcity. Mendoza (2004) viewed this precautionary analytical framework as a "natural extension of all previous theories." Distayat (2001) built on his work and developed a reserve demand model "compatible with the second

generation financial crisis". Barten (1982) conducted an empirical study partly based on Frenkel's model to determine the demand for foreign reserves under fixed and floating exchange rates. He developed an argument he called the intervention model, which assumed that reserves are held only to enable the central bank to intervene in foreign currency markets. He identified four major determinants of reserve demand: the variability of international payments and receipts, the propensity to import, the opportunity cost of holding reserves, and a scale variable measuring the size of international transactions.

Aizenman and Marion (2002) focused on the demand for international reserves in the Far East compared to the demand in other developing countries. Their research found that reserve holdings for the 1980-1996 periods are the outcome of several factors such as: international transactions, international transaction's volatility, the exchange rate arrangement, and political considerations. After the 1997 Asian financial crisis, they found that this model significantly under- predicted reserve holdings. In their research they showed that "sovereign risk and costly tax collection to cover fiscal liabilities lead to a large precautionary demand in reserves".

Although the literature reviewed here proposes several variables as determinants of reserve holdings, little has been said about reserve adequacy. Traditional measures, developed after the Breton Woods system collapsed in 1971-1973, used to be rules of thumb, such as three months of import cover. Reserve adequacy measures changed after the onset of the financial crises in the 1990s. Calvo (1996) suggested that a country's vulnerability to crisis should be measured, in part, by the size of its money

supply, defined broadly, relative to its reserve holdings, since broad money reflects a country's exposure to the withdrawal of assets.

In another study on demand for foreign exchange reserve for India, using cointegration and vector error correction approach, India's long run demand for foreign exchange reserves over has been observed to be determined by the ratio imports to GDP, the ratio of broad money to GDP, exchange rate flexibility and interest rate differentials. As reserve accumulation in India was observed highly sensitive to capital account vulnerability and less sensitive to its opportunity cost, need for Reserve Bank of India to speed up more active reserve management practices was recommended (Prabheesh, Malathy and Madhumati, 2007).

Finally, if the reason behind reserve holding by Nepal is concerned, investments, liquidity maintenance, safety and profitability are the major guidelines. Major portion (40 to 60%) is allocated for investments and other 40% for maintaining liquidity. The objectives of six months' import coverage and capability to cope with external debt obligations are embedded in the reserve handling guidelines.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Research Design

As already mentioned before, the topic is vague in itself because all the related aspects of capital account convertibility cannot be included due to space and time limits. If it is decomposed further, main objective will not be fulfilled. The study uses existing data of relevant variables which are not the result of CAC regime. The following three cases have been recognized as important points that need to be considered for this study are (1) the time series analysis of interdependence between capital (financial) account balance, current account balance and real effective exchange rate in Nepal; (2) the foreign exchange reserve trend and (3) the exchange rate scenario of Nepalese currency with Indian currency.

3.2. Data Conversion and Test Statistics

Time series analysis has been chosen to capture better real scenarios for all the cases. As per the availability of data and their inclusion in the models either yearly or quarterly time series data have been taken. For yearly time series data, periods from 1980 to 2010 has been included for the reason that if global scenario is studied, liberalization is found to begin since 1980s. The other reason is also that for the study we need GDP data, it is available only on yearly basis. Whereas for quarterly time series data, periods of 1993 to 2010 have been covered for the reason that legally Nepal began current account liberalization after third quarter of FY 1992/1993 (which is taken as year 1993) though liberalization began for 1990. In spite of higher influence of GDP, it has been discarded due to unavailability on quarterly basis.

All the time series data have been transformed to real values with base as the year 2001. GDP deflators have been calculated using CPI for Nepal, India and US. All the CPI values used have been converted to 1996 as the base year from the data obtained with different base years. Further, as the fiscal years are different for all these countries, they have been transformed to Nepalese fiscal year so as to provide basis for comparison. As CPIs of different countries cannot be compared in real sense due variability of included goods and their weight age based on consumption pattern in individual countries, the nearest CPIs have been chosen as proxy for comparison. Keeping this contrary in reality, national urban CPI for Nepal, Industrial workers CPI for India (NRB- Inflation in Nepal, 2007) and CPI-W (i.e., urban wage earners and clerical workers) for US have been selected. The real values have been calculated using the following expression;

Real Value= [Nominal value/ GDP Deflator]

Currently Nepal quotes exchange rates with 19 countries (http: www. nrb.org.np, 2011). Among them all are flexible except Indian currency. So the nominal exchange rates keep on changing with all the countries' currency except Indian currency. Unlike RER which is bilateral exchange rate, REER is the composite exchange rate index. REER can be calculated taking trade shares of all the trade partner countries and multiplying such trade weights with respect to RER indices and sum them up. For the purpose of study, NER index is calculated in terms of foreign currency value of local currency. In this case, a rise in the index represents a nominal appreciation of the local currency. While calculating RER, the NER is adjusted for the price differential by keeping the domestic price ($CPI_{domestic}$) in the numerator and the foreign price ($CPI_{foreign}$) in the denominator. The values of exchange rates have been used in two

ways based on the models. The models requiring only dual exchange rate, real exchange rate (RER) has been calculated based on the following expression;

RER= [$CPI_{foreign}$.Nominal Exchange Rate of NRs to foreign currency/ $CPI_{domestic}$].

In the same way, real effective exchange rate index (REERi) uses the following expression (taken from Thapa, 2008).

$$REERi = [\Sigma (RER_{iIC}.TW_{India}) + (RER_{i\$}.TW_{ROW})];$$

where, RER_{iIC} = the real exchange rate index of NC with IC, which is just the inverse of RER of NRs with IRs;

TW_{India} = Nepal's trade weight (share) with India;

$RER_{i\$}$= the real exchange rate index of NC with the US dollar, which is just the inverse of RER of NRs with USD and

TW_{ROW} = Trade weight with the ROW

Here we can include all the trading partner countries but for the study REER index has been calculated by taking only the most significant currencies- Indian Rupees and USD (Thapa; 2008) considering trade shares between India and ROW.

3.3. Test of Stationarity

To prevent from drawing any spurious inferences, we ensure that all the time series data are stationary. The Augmented Dickey-Fuller (ADF) test that requires the estimation of the following regression equation is used for testing the presence of unit root;

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum\nolimits_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(1);$$

where $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$ and so on; β_1, β_2, δ and α_i are the constants in the regression; and ϵ_t is a pure white noise error term. The null and

alternative hypotheses may be written as H0: $\delta= 0$ and H1: $\delta<0$ respectively. Tau (τ) value is evaluated using the conventional ratio as [δ (estimated) /Standard Error of estimated δ (S.E)]. Dickey and Fuller (1979) show that under the null hypothesis of a unit root, this statistic does not follow the conventional Student's t-distribution, and they derive asymptotic results and simulate critical values for various test and sample sizes. More recently, MacKinnon (1991, 1996) implements a much larger set of simulations than those tabulated by Dickey and Fuller (Gujrati and et al, 2009). If τ <DF or Mc Kinnon critical τ values, we reject the Null Hypothesis: $\delta=0$ indicating that the time series is stationary.

3.4. Granger Causality Test

In case of regression in time series data, precedence of one variable upon other variable or the direction of influence can be found by using the Granger Causality Test as developed by Granger (1969). It helps to find out how much of the current value (say y) can be explained by its past values and then to see whether adding lagged values of other influential variable (say x) can improve the explanation. Here, y is said to be Granger- caused by x if x helps in the prediction of y or if the lagged coefficients of x are statistically significant. However, it should be noted that Granger causality measures precedence and information content or influence rather that the cause and effect. Mathematically, the following two regression equations run among the time series variables x and y provide the basis for obtaining the causality.

$$x_t = \sum_{i=1}^{k}\alpha_{1i}\, x_{t-i} + \sum_{i=1}^{k}\alpha_{2i}\, y_{t-i} + \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

$$y_t = \sum_{i=1}^{k}\beta_{1i}\, x_{t-i} + \sum_{i=1}^{k}\beta_{2i}\, y_{t-i} + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

where ϵ_t and μ_t are the error terms for the corresponding equations, k is the lags selected and t is the time upon consideration. α_{1i}, α_{2i} and β_{1i}, β_{2i} are the coefficients for independent variables to be determined for the corresponding equations. The selection of lag(s), k is based on the LR ratio, AIC, HQ, FPE and SIC.

Now from equation (i), if the coefficients of lagged y (i.e. $\sum_{i=1}^{k}\alpha_{2i}$) $\neq 0$ or statistically different from zero and the set of estimated coefficients on the lagged x (i.e. $\sum_{i=1}^{k}\alpha_{1i}$) $= 0$ or statistically not different from zero, there will be unidirectional causality from y to x. Similarly, if $\sum_{i=1}^{k}\beta_{1i} \neq 0$ and $\sum_{i=1}^{k}\beta_{2i} = 0$, there will be unidirectional causality from x to y. However, when the sets of coefficients of x and y are not statistically significant in both the above regressions the relationship between them is considered as independent. In the same way feedback or bilateral causality is considered if the sets of coefficients of x and y are statistically significant in both of the regressions (i) and (ii). It should be noted that the prerequisite for this causality test is that the variables should be stationary.

The approach of Granger Causality Test has been used to find out the causal relationship between the current and capital account, current and real effective exchange rate and capital account and real effective exchange rate. Precondition for this is the stationary data series of the variables taken for the estimation of regression. So first stationarity of the time series data of KA, CA and XR are confirmed using the standard ADF test. The following equations are used for estimation of Granger causality if the variables are stationary;

$$KA_t = \sum_{i=1}^{k}\alpha_{1i}\, CA_{t-i} + \sum_{i=1}^{k}\alpha_{2i}\, KA_{t-i} + u_t \ldots\ldots\ldots\ldots.................................. (2.a)$$

$$CA_t = \sum_{i=1}^{k}\beta_{1i}\, CA_{t-i} + \sum_{i=1}^{k}\beta_{2i}\, KA_{t-i} + v_t \ldots\ldots\ldots\ldots.................................. (3.a)$$

$$KA_t = \sum_{i=1}^{k}\alpha_{1i}\, KA_{t-i} + \sum_{i=1}^{k}\alpha_{2i}\, XR_{t-i} + u_t \ldots\ldots\ldots\ldots.................................. (2.b)$$

$$XR_t = \sum_{i=1}^{k}\beta_{1i}\, KA_{t-i} + \sum_{i=1}^{k}\beta_{2i}\, XR_{t-i} + v_t \ldots\ldots\ldots\ldots..................................(3.b)$$

$$CA_t = \sum_{i=1}^{k} \alpha_{1i} \, CA_{t-i} + \sum_{i=1}^{k} \alpha_{2i} \, XR_{t-i} + u_t \; \dots\dots\dots\dots................................... \text{ (2.c)}$$

$$XR_t = \sum_{i=1}^{k} \beta_{1i} \, CA_{t-i} + \sum_{i=1}^{k} \beta_{2i} \, XR_{t-i} + v_t \; \dots\dots\dots\dots.................................\text{(3.c)}$$

; where KA, CA, XR are capital account balance, current account balance and real effective exchange rate respectively. u_t and v_t are the error terms for equation 1s and 2s respectively all being different though the same symbols have been used whereas k is the lags selected and t is the time upon consideration. α_{1i}, α_{2i}, β_{1i} and β_{2i} are the coefficients for independent variables to be determined for the corresponding equations whose values are different with different equations though the same symbols have been used. The selection of lag(s), k is based on the LR ratio, AIC, HQ, FPE and SIC.

3.5. VAR Methodology

Vector Autoregression is one of the famous forecasting methodologies for time series data. It is just an extension of Grangers Causality Method developed by Sims (Gujrati & Sangeetha, 2007). The peculiarity of this method is that it treats all the variables on the same footing on contrary to many other models that distinguish variables as exogenous and endogenous. Relationship between more than two variables can be achieved using this method. The only difference with the casuality model is that it contains the lagged value of the dependent variable on the right hand side, hence, the autoregression. In addition, as there will be vector of more than two variables, this methodology is called Vector Autoregression.

Mathematically, the following three regression equations run among the time series variables x, y and z comprise a VAR relationship. We can notice that the lagged values of the dependent variables are also included on right hand side.

$$x_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i}\, x_{t-i} + \sum_{i=1}^{k} \alpha_{2i}\, y_{t-i} + \sum_{i=1}^{k} \alpha_{3i}\, z_{t-i} + \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

$$y_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i}\, x_{t-i} + \sum_{i=1}^{k} \beta_{2i}\, y_{t-i} + \sum_{i=1}^{k} \beta_{3i}\, z_{t-i} + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots(5)$$

$$z_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i}\, x_{t-i} + \sum_{i=1}^{k} \gamma_{2i}\, y_{t-i} + \sum_{i=1}^{k} \gamma_{3i}\, z_{t-i} + \upsilon_t \dots\dots\dots\dots\dots\dots\dots\dots(6)$$

where ϵ_t, μ_t and υ_t are the error terms for the corresponding equations assumed to be uncorrelated (Gujrati & Sangeetha, 2007 and Maddla, 2008), k is the lags selected and t is the time upon consideration. α_0, α_{1i}, α_{2i}, α_{3i} ; β_0, β_{1i}, β_{2i}, β_{3i} and γ_0, γ_{1i}, γ_{2i}, γ_{3i} are the coefficients for independent variables to be determined for the corresponding equations. The selection of lag(s), k is based on the LR ratio, AIC, HQ, FPE and SIC. Usually lags being empirically determined, one fourth of the total samples are first chosen. Coefficients of the significant variables are only considered. It should be noted that the variables included in the model should be stationary.

The VAR model has been devised as under on the similar footage as described with equations (4), (5) and (6) in VAR methodology except that the variables of concern are KA, CA and XR;

$$KA_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i}\, CA_{t-i} + \sum_{i=1}^{k} \alpha_{2i}\, KA_{t-i} + \sum_{i=1}^{k} \alpha_{3i}\, XR_{t-i} + u_{tk} \dots\dots\dots (4.a)$$

$$CA_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i}\, CA_{t-i} + \sum_{i=1}^{k} \beta_{2i}\, KA_{t-i} + \sum_{i=1}^{k} \beta_{3i}\, XR_{t-i} + v_{tc} \dots\dots\dots.(5.a)$$

$$XR_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i}\, CA_{t-i} + \sum_{i=1}^{k} \gamma_{2i}\, KA_{t-i} + \sum_{i=1}^{k} \gamma_{3i}\, XR_{t-i} + w_{tx} \dots\dots\dots(6.a)$$

; where α_0, α_{1i}, α_{2i}, α_{3i} , β_0, β_{1i}, β_{2i}, β_{3i} and γ_0, γ_{1i}, γ_{2i}, γ_{3i} are the coefficients for independent variables to be determined for equations (4.a), (5.a), and (6.a) respectively (Please note that though the same symbols have been used they will have different values accordingly as per equations). u_{tk}, v_{tc} and w_{tx} are noise terms.

Since VAR models are also used for forecast, it is necessary to affirm whether the residuals (or noise terms) are stationary and the model is stable. To confirm for the stationarity of u_{tk}, v_{tc} and w_{tx}, ADF tests and correlogram have been drawn for each of

them whereas stability of the model has been confirmed by checking whether the roots of the characteristic polynomial of the VAR lie within the unit circle. If the roots lie inside the unit circle, the model is considered as stable. Finally, residual portmanteau test has also been done to check whether the same errors u_{tk}, v_{tc} and w_{tx} are serially independent or there is no autocorrelation among them.

3.6. Co-integration Methodology

It has been mentioned in most of the econometric books that regression of a nonstationary time series on another non stationary time series may produce a spurious regression. So, first stationarity of the variables are confirmed. If the variables are not stationary and are I(1), we check whether the equation (7) is cointegrating equation or not.

$$y_t = \alpha_0 + \alpha_1 x_{t1} + \alpha_2 x_{t2} + \alpha_3 x_{t3} + \ldots + \alpha_{tn} x_{tn} + u_t \ldots\ldots\ldots\ldots\ldots(7)$$

$$u_t = y_t - \alpha_0 - \alpha_1 x_{t1} - \alpha_2 x_{t2} - \alpha_3 x_{t3} - \ldots - \alpha_{tn} x_{tn} \ldots\ldots\ldots\ldots\ldots(8)$$

Cointegrating relationship can be ascertained if the error term u_t given by (8) is stationary or I(0). It should be noted that while testing for unit root test for u_t, DF and ADF critical values are not appropriate as the estimated residuals (or u_t) are based on the estimated cointegrating parameter α_0. Stationarity of the residuals are confirmed by comparing the calculated DF or ADF values with the critical values calculated by Engle- Granger and augmented Engle- Granger (Gujrati & Sangeetha, 2007). Then we proceed for ECM as depicted on the equation (9) below that gives short run equilibrium directions and corrections.

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta x_{t1} + \alpha_2 \Delta x_{t2} + \alpha_3 \Delta x_{t3} + \ldots + \alpha_{tn} \Delta x_{tn} + u_{t-1} + \epsilon_t \ldots\ldots\ldots\ldots(9)$$

Finally, in order to get the best model, only the variable(s) that are most significant are chosen based on the redundancy test using LR test.

3.6.1. Cointegration Models for International Reserve

From the empirical findings of many scholars, the reason behind holding reserves can be summarized to transactions motive, precautionary motive, mercantile motive, the sensitiveness of variables of capital account and the opportunity cost of holding reserves. Considering the ongoing trend of Nepalese economy, GDP, CAB, KAB and REER have been considered. However, in spite significant influence of interest rate differential, which is considered as the nearest proxy to capture the cost or profit of reserves holding (in other words, the opportunity cost of the holding reserves), due to unavailability of historical data for all the participating member financial institutions, this has not been included in the model.

As the GDP shows the overall measure for the income of the economy, the demand of reserves should grow as GDP increases, so positive sign of its coefficient has been expected. For transaction motive, propensity to import is considered whereas for the mercantile motive propensity to export has been widely considered. In many literatures the nearest proxy has been taken as Import to GDP (M/ GDP) and export to GDP (X/GDP) but for this study CAB/GDP ratio has been considered to incorporate the influence of both imports and exports along with other service and income related items. Since higher CAB/GDP demands for higher reserve level and vice- versa in the economy, this variable should also have positive sign of its coefficient.

As precautionary motive, currently we will not have many variables as Nepal is not allowing capital account convertibility. But for this Exchange rate volatility, external

debt obligations can be considered. As infamously considered by almost all the economists, short term external debts as the culprit of many external crisis in recent time, it should have been considered, however, due to absence of capital liberalization this has no significance in our case. Still to capture the influence of capital related items, KAB/GDP has been considered.

Theoretically, excess supply of money may affect the reserves flows. This approach suggests a country's balance of payments disequilibrium is directly related to disequilibrium in country's domestic money market. In a case of an excess demand for money, it must be satisfied by an increase in foreign exchange holdings of a country's central bank. Broad money to GDP (M2/GDP) has been supposed to reflect this scenario.

Finally exchange rate has also been incorporated in the model as volatility in exchange rate affects the overall value of the reserve. So as to get the relationship and forecast between the ratio variables- international reserve to GDP (IRg_t), CAB/GDP (CAg_t), KAB/GDP (KAg_t), and XR_{Ut} (RER of NRs per USD), the methods of cointegration and ECM have been deployed.

Yearly time series data have been used for this purpose as quarterly GDP data series is not available. If the variables are not stationary and are I(1), we check whether the equation (7) is cointegrating equation or not. Cointegrating relationship can be ascertained if the error term u_t is stationary or I(0). Then we proceed for ECM as depicted on the equation (8).

$$IRg_t = \alpha_0 + \alpha_1 CAg_t + \alpha_2 KAg_t + \alpha_3 M2g_t + \alpha_4 XR_{Ut} + u_t \ldots\ldots\ldots\ldots\ldots(7.a)$$

; where $u_t = IRg_t - \alpha_0 - \alpha_1 CAg_t - \alpha_2 KAg_t - \alpha_3 M2g_t - \alpha_4 XR_{Ut}$

$$\Delta IRg_t = \alpha_0 + \alpha_1 \Delta CAg_t + \alpha_2 \Delta KAg_t + \alpha_3 \Delta M2g_t + \alpha_4 \Delta XR_{Ut} + u_{t-1} + \epsilon_t \ldots\ldots\ldots\ldots(8.a)$$

The constants and coefficients of the variables in equations (7.a) and (8.a) will have different values though same symbols (α_0, α_1, α_2, α_3 and α_4) have been used and the Δ denotes the first difference of the corresponding variables.

The best model with most significant variables will be chosen based on redundancy test using LR test. Among the variables CAg_t, KAg_t, $M2g_t$ and XR_{Ut} the most significant variables are choosen and at the same time corresponding cointegrating relationships that hold true are considered. Stationarity of u_t is confirmed by comparing the calculated t- static (τ) to the AEG critical values.

3.6.2. Cointegration Models for Exchange Rate Scenario

For the analysis, exchange rate of Nepal with India (XRni), trade balance between India and America (TBia), exchange rate between India and America (XRia) has been considered. As exchange rate of Nepal is just the cross reflection of Indian currency's exchange rate with other countries except for Indian currency itself, to which Nepalese currency is pegged, trade balance of India with its trade partners need to be included in the model. However, we have considered only trade balance of India with US because USD is considered as the standard international currency as reference. As trade between India and US also influences exchange rate between them, XRia also needs to be included. In order to get the relationship, first of all, all the variables are tested for stationarity and then for cointegration. If cointegration relationship exists we check for the existence of short- run relationship via error correction model.

$$XRni_t = \alpha_0 + \alpha_1\, TBia_t + \alpha_2\, XRia_t + u_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7.b)$$
;where $u_t = XRni_t - \alpha_0 - \alpha_1\, TBia_t - \alpha_2\, XRia_t$

$$\Delta XRni_t = \alpha_0 + \alpha_1\, \Delta TBia_t + \alpha_2\, \Delta XRia_t + u_{t-1} + \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots(8.b)$$

; where $XRni_t$ is the real exchange rate of NRs per IRs, $TBia_t$ denotes the trade balance between India and US and $XRia_t$ denotes the real exchange rate of IRs per USD. Other variables α_0, α_1, α_2 are the constants of the corresponding variables. Δ denotes the first difference of the corresponding variables.

Besides these, objective is also to find out estimated relationship between NRs and IRs without considering other variables. For this all the procedures will be same except that there will be only two variables as mentioned below;

$$XRni_t = \alpha_0 + \alpha_1\, XRia_t + u_t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (7.c)$$

;where $u_t = XRni_t - \alpha_0 - \alpha_1\, XRia_t$

$$\Delta XRni_t = \alpha_0 + \alpha_1\, \Delta XRia_t + \alpha_2\, u_{t-1} + \epsilon_t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.. \ (8.c)$$

Again, as the volatility in exchange rates impacts trade trends, to find out the relationship of trade balance of Nepal with India (TBni) and RER of NRs with IRs (XRni), the following cointegrating and ECM models have been used.

$$XRni_t = \alpha_0 + \alpha_1\, TBni_t + u_t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (7.d)$$

;where $u_t = XRni_t - \alpha_0 - \alpha_1\, TBni_t$

$$\Delta XRni_t = \alpha_0 + \alpha_1\, \Delta TBni_t + \alpha_2\, u_{t-1} + \epsilon_t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots... (8.d)$$

In all of the above regressions the constants and coefficients of the variables will have different values though same symbols (α_0, α_1, α_2) have been used.

3.7. Calculation of Augmented Engle- Granger (AEG) Critical Values

As it has already been mentioned that general ADF critical values cannot be used for the confirmity of stationarity of residuals of regression that are supposed to have cointegrating relationship. So this section describes the method to calculate the AEG

critical values, which are entirely adopted from MacKinnon (2010): 'Critical Values for Cointegration Tests'. According to this the estimated critical value for any sample size is given by the response surface regression as under;

$$C(p) = \beta_\infty + \beta_1/T + \beta_2/T^2 + \beta_3/T^3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(10)$$

Where $C(p)$ is the critical value at p% level of significance, β_∞ is the estimated asymptotic critical value, β_1 is the coefficient of T^{-1} in response surface regression. Similarly, β_2 and β_3 are the coefficients on T^{-2} and T^{-3} respectively. All the values of β_∞, β_1, β_2 and β_3 are tabulated for 1, 5 and 10 percent of significant level for inclusion of cointegrating regression with constant, constant and trend as well as constant and trend square. The calculation of the AEG critical values have been summarized in Annex (II).

3.8. Likelihood Ratio (LR) Test for the Omission of Redundant Variable(s)

LR test is the way to test whether the estimated coefficients of variables under study are significant or not. This helps to reduce over specification that can occur with the inclusion of unnecessary redundant variables. In this test, among a set of variables in an existing equation whether a sub set of variables have zero coefficients or not are identified. If the sub set of variables have zero coefficients, they can be deleted from the equation. The null hypothesis is that the sub set of regressors are not jointly significant. Mathematically the LR statistic is computed as LR= 2(ULLF- RLLF); where ULLF is the unrestricted log likelihood function that includes all the variables and RLLF is the restricted log likelihood function in which some of the variables are omitted. If the sample size is large LR follows the chi- square (χ^2) distribution with df

equal to the number of restrictions imposed by the null hypothesis. Now the logic is that if LR=0(or significantly smaller), the restricted and unrestricted log LF should be same, so that the omitted variables will have no significance and can be removed from the equation. However, if LR≠0 (or significantly not smaller), we cannot remove the variables under test for redundancy (Gujrati & Sangeetha, 2007).

3.9. Estimation and Data Analysis

This is the most important aspect of the study, which will try to provide way out as well as preconditions for achieving successful landing to CAC regime with reference to the current scenario of current account, capital account, international reserve and existing exchange rate regime of Nepal, especially with India.

All the necessary econometric calculations have been estimated by using Eviews 4.1 and general calculations required for data mining and purification like taking sum, average, and conversion to real values from nominal values obtained from data sources have been performed by using Excel 2007. Correction of autocorrelation in regression equations has been done using Stata 10.

3.10. Nature and Sources of Data

Since Nepal has not pursued CAC, there will not be any relevant data for the variables that have real significance for economy. However, the relevant variables that are used for the purpose of this study will be used from secondary resources. The following Table 3.1 best summarizes the sources of corresponding variables used for the study.

Table 3.1: Data Source for Variables under study

SN	Variables	Data Source
1	GDP	CBS, Nepal
2	Quarterly and Yearly CAB	Various issues of Quarterly Economic Bulletins, NRB
3	Quarterly and Yearly KAB	Various issues of Quarterly Economic Bulletins, NRB
4	Quarterly and Yearly Exchange Rates of NRs with IRs and USD	Various issues of Quarterly Economic Bulletins, NRB
5	Quarterly and Yearly National CPI for Nepal	Various issues of Quarterly Economic Bulletins, NRB
6	Monthly Industrial Workers CPI for India	Labour Bureau, Government of India (http://labourbureau.nic.in/indtab.html)
7	Monthly Exchange Rate of Indian Rs per USD	RBI, India (http://www.rbi.org.in)
8	Trade of USA in goods with India and Nepal	U.S. Census Bureau, Foreign Trade (http://www.census.gov/foreign-trade/data/)
9	Monthly Urban CPI(CPI-U)	U.S. Department of Labor, Bureau of Labor Statistics (http://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/)

All the CPI data for Nepal, India and USA have been indexed with base year 1996 (as 100), whereas remaining all other variables under study have been converted to real values with respect to the assumption of base year 2001 as 100. As from literature liberalization has been prominent after eighties in advanced and European countries and other developing, poor countries have tried to emulate similar philosophies gradually after that, yearly data since 1980 have been considered for this study. But to become more specific with much availability of data for some variables, data from 1993 first quarter to 2010 fourth quarter have been taken to capture the relevancy of variables after current account was initiated for convertibility.

CHAPTER FOUR

EMPIRICAL RESULTS AND ANALYSIS

So far as three specific scenarios- the interdependence among capital account balance, current account balance and real effective exchange rate in Nepal; the foreign exchange reserve trend and the exchange rate scenario of Nepalese currency vis-a-vis Indian currency have been recognized as important. The empirical results obtained for each of them are described below.

4.1.   Interdependence among KA, CA and XR

The quarterly data for real values for KA, CA and XR are all stationary, i.e. I (0). All the results have been presented in Table 4.1 with corresponding level of significances.

Table 4.1: ADF Unit Root Test for Quarterly CA, KA and REER

SN	Null Hypothesis	Exogenous	Critical t Values			t-Statistic	*Prob.	DW	Remarks
			1% level	5% level	10% level				
1	CA has a unit root	constant	-3.526	-2.903	-2.589	-4.230	0.0012	2.012	Stationary at 1% level of significance
		Constant, Linear Trend	-4.092	-3.474	-3.164	-5.295	0.0002	1.919	Stationary at 1% level of significance
		none	-2.598	-1.945	-1.614	-4.192	0.0001	2.023	Stationary at 1% level of significance
2	KA has a unit root	constant	-3.527	-2.903	-2.589	-3.343	0.0166	1.900	Stationary at 5% level of significance
		Constant, Linear Trend	-4.094	-3.475	-3.165	-3.277	0.0786	1.883	Stationary at 1% level of significance
		none	-2.598	-1.945	-1.613	-3.039	0.0029	1.905	Stationary at 1% level of significance
3	XR has a unit root	constant	-3.526	-2.903	-2.589	-2.506	0.1184	2.215	Non- stationary
		Constant, Linear Trend	-4.092	-3.473	-3.164	-3.962	0.0144	2.195	Stationary at 5% level of significance
		none	-2.598	-1.945	-1.614	-0.479	0.5047	2.112	Non- stationary

*MacKinnon (1996) one-sided p-values

The study has found interesting results of granger causality based on the significant probability values less than or equal to 0.10. With reference to the output as obtained in Table 4.2, the F- statistics and their corresponding values of probability suggest that there is no significant causality between KA and CA from second to fifth lags.

But the F- statistics (i.e., 3.48831) at first lag only shows the unidirectional causality from CA to KA at 10% level of significance thereby rejecting the null hypothesis that CA does not Granger cause KA. From all these we cannot assure significant casual relationship between KA and CA in the case of Nepal.

Table 4.2: Pairwise Granger Causality Tests between CA and KA

Lag	Null Hypothesis:	Obs	F-Statistic	Probability	Casuality Remarks
5	CA does not Granger Cause KA	67	1.41753	0.23212	No causality
	KA does not Granger Cause CA		1.38763	0.24291	No causality
4	CA does not Granger Cause KA	68	0.97893	0.42604	No causality
	KA does not Granger Cause CA		1.40165	0.24458	No causality
3	CA does not Granger Cause KA	69	1.26172	0.29532	No causality
	KA does not Granger Cause CA		0.96461	0.41519	No causality
2	CA does not Granger Cause KA	70	1.97015	0.14767	No causality
	KA does not Granger Cause CA		1.9643	0.14849	No causality
1	CA does not Granger Cause KA	71	3.48831**	0.06611	Casuality
	KA does not Granger Cause CA		0.44326	0.50781	No causality

Note: * and ** indicates the statistical significance at the level of 5 and 10% respectively.

In the same way the test for the Granger causality test between KA and XR cannot predict any causation or precedence among them. This means there is no any evidence of causality between KA and XR. The test results are shown below in Table 4.3.

Table 4.3: Pairwise Granger Causality Tests between XR and KA

Lag	Null Hypothesis:	Obs	F-Statistic	Probability	Casuality Remarks
5	XR does not Granger Cause KA	67	0.6479	0.66421	No causality
	KA does not Granger Cause XR		1.36219	0.25244	No causality
4	XR does not Granger Cause KA	68	0.49359	0.74043	No causality
	KA does not Granger Cause XR		1.23321	0.30664	No causality
3	XR does not Granger Cause KA	69	0.549	0.65069	No causality
	KA does not Granger Cause XR		2.0648	0.11402	No causality
2	XR does not Granger Cause KA	70	0.78319	0.46121	No causality
	KA does not Granger Cause XR		0.54754	0.58101	No causality
1	XR does not Granger Cause KA	71	2.1698	0.14536	No causality
	KA does not Granger Cause XR		1.16955	0.28331	No causality

Note: * and ** indicates the statistical significance at the level of 5 and 10% respectively.

Again the causality test (as shown in Table 4.4) observed between CA and XR shows contradiction at third and fifth lags where there is no causality between both variables in the third lag, and in contrary, both the variables show causality at fifth lag.

Table 4.4: Pairwise Granger Causality Tests between XR and CA

Lag	Null Hypothesis:	Obs	F-Statistic	Probability	Casuality Remarks
5	XR does not Granger Cause CA	67	3.21221*	0.01279	Casuality
	CA does not Granger Cause XR		2.51258*	0.04023	Casuality
4	XR does not Granger Cause CA	68	3.50586*	0.01235	Casuality
	CA does not Granger Cause XR		0.36943	0.82947	No causality
3	XR does not Granger Cause CA	69	1.93118	0.13378	No causality
	CA does not Granger Cause XR		0.36976	0.77508	No causality
2	XR does not Granger Cause CA	70	2.73847**	0.07214	Casuality
	CA does not Granger Cause XR		0.16811	0.84563	No causality
1	XR does not Granger Cause CA	71	4.84512*	0.03112	Casuality
	CA does not Granger Cause XR		0.25426	0.61572	No causality

Note: * and ** indicates the statistical significance at the level of 5 and 10% respectively.

At the first, second and fourth lags there are significant unidirectional causality from CA to XR at 5, 10 and 1% level of significance respectively.

Now the best fitted estimation of VAR equations with significant explanatory variables taking KA, CA and XR as dependent variables are given below represented by equations (4), (5) and (6). All the variables appeared in the VAR equations are significant at 5% level of significance. Output showing all the variables with significant and non- significant variables and their corresponding t- statistics are given in Annex I (Tables III, IV & V).

$$KA_t = -903.92 - 210.56\, XR_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots...................................(4.a)$$

t: (-0.309)   (-1.688)

(N=72, R^2= 0.346, DW= 1.8)

$$CA_t = -4538.101 + 0.37\ CA_{t-1} + 289.7\ XR_{t-3}\dots\dots\dots\dots\dots\dots\dots\dots\dots(5.a)$$

t: (-1.524)   (2.662)   (2.211)

(N=72, R2= 0.56, DW= 2.088)

$$XR_t = 5.62 + 0.0004 CA_{t-5} - 0.0003 KA_{t-3} + 0.74 XR_{t-1} + 0.25 XR_{t-4} - 0.33 XR_{t-5}\ \dots\dots(6.a)$$

t: (2.053) (3.147)   (-2.089)   (6.312)   (1.993)   (-2.903)

(N=72, R^2= 0.86, DW= 1.988)

From the equation (4.a), all the coefficients are insignificant except for XR_1 (first lag) which is significant only at level of 10%. This means KA has no any significant relationship with CA, however, to some extent with current or non- lagged XR. Although there is no any causality among KA and XR as already noted above (and shown in Table 4.3), this estimation obtained from VAR has been mentioned. This shows that there is inverse relationship between KA and XR. An increase in XR (depreciation) by one unit in the previous quarter will lead to decrease in KA by 210 units in current quarter.

Similarly CA as dependent variable, coefficients of its first lag and third lag of XR are significant at 1% level indicating its relationship with XR but not with KA with reference to the equation (5.a). Once again, revisiting the granger causality among CA and KA, it was obtained that CA is led by KA with the first lag. In the same way, at first, second and fourth lags there were unidirectional causalities from CA to XR leaving behind other contradictory results of bidirectional and no causality. Instead of these, VAR estimation thus obtained contains first lag of CA and the third lag of XR as significant variables to influence CA in the current period. It shows positive relations of CA at current quarter with its value in the previous quarter as well as the XR in the previous third quarter.

From these two estimations with KA and CA as dependent variables, it is important to note that KA is negatively related to XR whereas CA is positively related with XR. The reason behind this contradiction requires further study and has been left out as it is not under the scope of this study.

Next, XR being dependent variable, the coefficient of fifth lag of CA (significant at 1%) and third lag of KA (significant at 5%) are found to have positive and negative influence respectively. In addition to CA and KA, XR is observed to be dependent on its first, fourth and fifth lags whose coefficients are significant at 1, 5 and 1% respectively. This has been depicted by equation (6.a). The influence of XRs in nearer lags is stronger than with farther lags. It is interesting to note here that this estimation is in line with above estimations with KA and CA as dependent variable. As in equation (4.a), KA has inverse relationship with XR and as in equation (5.a), XRs have proportional relationship with CA with an exception being the fifth lag of XR.

From these VAR equations, it can be ensured that XR can be forecast with least errors as the data fitness is the largest, i.e. 86% among three models. The values of R^2 are relatively lower due to exclusion of lags that (might) have partial influences. Conformity regarding whether the VAR models are spurious in nature or not, unit root test for the residuals u_{tk}, v_{tc} and w_{tx} have been performed and presented in table below that shows stationarity at all the significant levels.

Table 4.5: ADF Unit Root Test for u_{tx}, v_{tx} and w_{tx}

SN	Null Hypothesis	Exogenous	Critical t Values			t-Statistic	*Prob.	DW	Remarks
			1% level	5% level	10% level				
1	U_{tk} has unit root	constant	-4.094	-3.475	-3.165	-7.159	0.00	1.871	Stationary at 1% level of significance, KA as regressand
		Constant, Linear Trend	-4.092	-3.474	-3.164	-7.152	0.00	1.884	
		none	-2.600	-1.946	-1.614	-7.224	0.00	1.870	
2	Vtc has a unit root	constant	-2.600	-1.946	-1.614	-8.377	0.00	1.974	Stationary at 1% level of significance, CA as regressand
		Constant, Linear Trend	-4.094	-3.475	-3.165	-8.383	0.00	1.979	
		none	-2.600	-1.946	-1.614	-8.444	0.00	1.973	
3	Wtx has a unit root	constant	-3.526	-2.906	-2.589	-8.007	0.00	1.992	Stationary at 1% level of significance, XR as regressand
		Constant, Linear Trend	-4.092	-3.474	-3.164	-8.151	0.00	1.993	
		none	-2.600	-1.946	-1.614	-8.071	0.00	1.991	

*MacKinnon (1996) one-sided p-values

Similarly, if the correlogram plots of u_{tk}, v_{tc} and w_{tx} presented in Annex I (Figures 1, 2 and 3) are observed, there are no any spikes for the first lag for ACF and PACF confirming the stationarity. The evidence of stationarity for all the residuals confirms the series as I (0) and the resulting regression will not be misleading. Furthermore, to ensure the stability of VAR model, the inverse roots of the characteristics AR polynomials is found to lie within unit circle. As observed in the Annex I (Table V), values of all the roots are less than unity, all the modulus values are less than unity and the inverse roots of the AR characteristic polynomials lie within the unit circle (refer Figure 4 in Annex I). Finally, after the stability being ensured, confirmation of serial independence for the same residuals through VAR Portmanteau test for autocorrelations show that up to fifth lag the hypothesis of serial correlations have been rejected at 5% level of significance and the same hypothesis has been rejected at

10% level of significance. So the residuals or errors u_{tk}, u_{tc} and u_{tx} are serially independent (Refer Table VI in Annex I).

It should be noted that the above mentioned VAR model has been selected after having selection of proper lags. Some popular model selection criterions like LR, AIC, SIC, FPE and HQ are basis for this. As suggested by Gujarati and Sangeetha (2009), initially near to one fourth of the total sample (which is 72), i.e., 17 lags were selected and gradually tested by reducing lags up to first to find out significant differences. This resulted in the selection of lags up to 5 because LR, FPE and AIC statistics are significant at 5% level whereas at the same level of significance HQ and SIC choose the second lag. The output of lag selection process is shown in Annex I (Table 1 and 2), where results with lags 12 and 5 have only been presented due to differences in observations.

4.2.   The foreign exchange reserve trend

It can be shown that the variables IRg, M2g, CAg, KAg and XR_{Ut} are all non stationary. However, the first difference of all the variables are stationary at 1% level of significance indicating all of them as I (1) series data because the calculated t-statistic is less than the critical values at all the levels of significance. Please refer to the Table 4.6 below for these results.

Table 4.6: ADF Unit Root Test for Yearly IRg, CAg, KAg, M2g and XRu (All with first difference)

SN	Null Hypothesis	Exogenous	Critical t values			t-Statistic	*Prob.	DW	Remarks
			1% level	5% level	10% level				
1	IRg has a unit root	constant	-3.67932	-2.96777	-2.62299	-4.12686	0.0033	1.733918	Stationary at 1% level of significance
		Constant, Linear Trend	-4.30982	-3.57424	-3.22173	-3.91504	0.0243	1.746739	Stationary at 1% level of significance
		none	-2.65015	-1.95338	-1.6098	-4.0989	0.0002	1.760836	Stationary at 1% level of significance
2	CAg has a unit root	constant	-3.68919	-2.97185	-2.62512	-7.08722	0.0000	1.948728	Stationary at 1% level of significance
		Constant, Linear Trend	-4.32398	-3.58062	-3.22533	-6.96202	0.0000	1.947494	Stationary at 1% level of significance
		none	-2.65015	-1.95338	-1.6098	-7.2322	0.0000	1.949294	Stationary at 1% level of significance
3	KAg has a unit root	constant	-3.67932	-2.96777	-2.62299	-5.46124	0.0001	2.015438	Stationary at 1% level of significance
		Constant, Linear Trend	-4.30982	-3.57424	-3.22173	-5.35709	0.0008	2.015382	Stationary at 1% level of significance
		none	-2.64712	-1.95291	-1.61001	-5.56098	0.0000	2.015122	Stationary at 1% level of significance
4	M2g has a unit root	constant	-3.67932	-2.96777	-2.62299	-4.97603	0.0004	1.864842	Stationary at 1% level of significance
		Constant, Linear Trend	-4.32398	-3.58062	-3.22533	-4.96748	0.0021	1.84622	Stationary at 1% level of significance
		none	-2.64712	-1.95291	-1.61001	-3.61887	0.0008	1.967796	Stationary at 1% level of significance
5	XRu has a unit root	constant	-3.67932	-2.96777	-2.62299	-3.71221	0.0092	1.928138	Stationary at 1% level of significance
		Constant, Linear Trend	-4.30982	-3.57424	-3.22173	-4.78622	0.0033	1.978121	Stationary at 1% level of significance
		none	-2.64712	-1.95291	-1.61001	-3.74752	0.0005	1.951039	Stationary at 1% level of significance

*MacKinnon (1996) one-sided p-values

We can test whether the regression equation (7') is cointegrating regression or not by testing unit root test for the errors of the following equation.

$IRg_t = -0.076 + 0.297CAg_t + 0.252KAg_t + 0.270M2g_t + 0.002XR_{Ut}$ ………. (7')

t:　　　(-2.795227)　(1.64338)　(1.251718)　　(4.579676)　　　(3.519615)

　　　　　　$(N= 31, R^2 = 0.85 \& DW= 0.48)$

It can be shown that the error term u_t is not I(0), indicating that the equation (7') is not the cointegrating regression. It is shown in below Table 4.7.

Table 4.7: Unit Root Test for Errors in Cointegration models for International Reserve Trend

SN	Null Hypothesis	Exogenous	Critical AEG τ Values			t-Statistic	DW	Remarks
			1% level	5% level	10% level			
1	u_t has a unit root	none	-5.7112	-4.881	-4.482	-2.540	1.628	Non stationary, i.e. Errors are not I(0), Equation (7')
2	u_t has a unit root	none	-4.792	-4.027	-3.656	-4.519	1.765	Stationary at all significant level, Equation (7'.b)

Critical AEG Values taken from Annex II (Table VIII)

In order to get rid of model specification error, redundant variables that are not significant have been omitted from the model. If t- values of the coefficients for the corresponding variables are observed, only the coefficients of M2g and XRu are significant at 1% level. The same tests can be reiterated by taking one of the variables and the most significant result obtained. This has been shown below in the Table 4.8.

Table 4.8: LR Test for Redundant variables among CAg, KAg, M2g and XRu

Redundant Variables: CAG					
F-statistic	2.700699	Probability	0.11235	Akaike info criterion	-4.424364
Log likelihood ratio	3.063573	Probability	0.08007	Schwarz criterion	-4.239333
Redundant Variables: KAG					
F-statistic	1.566798	Probability	0.22182	Akaike info criterion	-4.464673
Log likelihood ratio	1.813982	Probability	0.17803	Schwarz criterion	-4.279642
Redundant Variables: M2G					
F-statistic	20.97343	Probability	*0.0001	Akaike info criterion	-3.931703
Log likelihood ratio	18.33606	Probability	1.9E-05	Schwarz criterion	-3.746672
Redundant Variables: XRU					
F-statistic	12.38769	Probability	*0.00161	Akaike info criterion	-4.133548
Log likelihood ratio	12.07885	Probability	0.00051	Schwarz criterion	-3.948518

*As the variables M2G and XRU are significant, other variables CAG and KAG can be omitted from the model

Following the LR test for redundant variables and model selection criterion AIC and SIC, the influential variables for international reserve to GDP (IRg) are found to be M2g and XRu. When the variables KAg and M2g are removed from the model, CAg and XRu are found to be significant, however, there will not be any cointegration among them, so this model has been excluded. The following cointegration equation has been recognized as the best model.

$$IRg_t = -0.076 + 0.32M2g_t + 0.002XR_{Ut} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (7'.a)$$

t: (-3.540) (7.050)   (3.083)

(N=72, R^2= 0.83, DW= 0.486)

We can observe small value of Durwin- watson in the estimation (7'.a), which indicates presence of serial correlation. Further, there are no any lagged dependent variables. Due to this the estimated OLS is consistent but inefficient and the standard errors are wrong too. In order to get rid of such problem we can employ the generalized least squares Prais Winsten (GLS- Prais Winsten) or the Cochrane- Orcutt procedure, which are commonly known as FGLS (Feasible Generalized Least Squares). Both the Cochrane- Orcutt (CO) and Prais- Winsten(P-W) are identical except that the later procedure takes care of first observation that will be lost in former CO procedure (Gujarati and Sangeetha, 2009). After correcting for autocorrelation we get the following estimation whose Durbin- Watson value has been improved so that estimation will be more efficient than without correction.

$$IRg_t = -0.058 + 0.29M2g_t + 0.002XR_{Ut} \dots\dots\dots\dots\dots\dots\dots\dots (7'.a')$$

$t:$ (-1.48) (4.01) (2.04)

$(N{=}31, R^2{=}\ 0.51, DW{=}\ 1.5)$

As the error term is stationary or I (0) as shown in Table 4.7 above, the following ECM for short run equilibrium is obtained.

$$\Delta IRg_t = -0.003 + 0.44\Delta M2g_t + 0.002XR_{Ut} - 0.318u_{t-1} \dots\dots\dots\dots (8'.a)$$

$t:$ (-0.934364) (2.813233) (1.635925) (-2.557065)

$(R^2{=}\ 0.38, DW{=}\ 1.6)$

It means that ϵ_t is the short-run equilibrium errors for the equation (7'.a). Thus, these errors can be used to tie the short- run behavior of IRg to its long- run value in equations (7'.a). ADF unit root test critical values for the errors in the regression equation (7'.a) along with AEG critical values have been presented in Table 4.7 for the comparison to ensure the existence of cointegration.

The results from these last two equations show that 0.318 of the discrepancy in the values of IRg with M2g and XRu in the previous year is eliminated in this year. Short- run changes in XRu is very slowly reflected in IRg keeping changes in M2g constant as the slope coefficient or the constant for XRu is very small (i.e. 0.002). The similar is the case with M2g but its change is very promptly reflected in IRg as the

slope coefficient is greater than for XRu. It can be ensured that IR is more sensitive to money supply.

From the empirical results obtained we found that M2 and XRu are the most significant variables that impact the reserve levels. The other variables KAg and CAg seem to have insignificant influence on the level of reserve in direct terms. So for Nepal, the higher supply of money is the main cause for increment is reserve level. At the same time additional reason behind holding reserve is to avoid exchange rate fluctuation risk. After correction the correlation, the DW value is improved however, only 51% of changes in the regressors (M2g and XRu) are reflected in reserve level. Further study is required to find out other important missing variables and to determine the variables that comes first or which one is the cause for the other.

4.3.   Exchange Rate Scenario of Nepalese and Indian currency

As mentioned in the empirical strategy we perform two different tests, one by considering all the three variables XRni, TBia and XRia and another considering only XRni and XRia for analyzing the exchange rate scenario of Nepalese and Indian currency. The procedures are same and for both the expressions there exist cointegrating regression as both the corresponding error terms are stationary or I (0). Similarly, all the variables under study are stationary at first difference (i.e. I(1)). The ADF unit root test result and the corresponding ADF unit root tests for the errors with AEG critical values are given in Tables 4.9 and 4.10 respectively for all the mentioned cases (regressions (7'.b), (7'.c) and (7'.d)).

Table 4.9: ADF Unit Root Test for Quarterly XRni, TBia and XRia(All with first difference)

SN	Null Hypothesis	Exogenous	Critical t values			t-Statistic	*Prob.	DW	Remarks
			1% level	5% level	10% level				
1	XRni has a unit root	constant	-3.528	-2.904	-2.589	-8.943	0.00	2.306	Stationary at 1% level of significance
		Constant, Linear Trend	-4.097	-3.476	-3.165	-8.942	0.00	2.328	Stationary at 1% level of significance
		none	-2.599	-1.945	-1.614	-9.008	0.00	2.305	Stationary at 1% level of significance
2	TBia has a unit root	constant	-3.527	-2.903	-2.589	-12.791	0.0001	2.046	Stationary at 1% level of significance
		Constant, Linear Trend	-4.094	-3.475	-3.165046	-12.732	0.0001	2.052	Stationary at 1% level of significance
		none	-2.598	-1.945	-1.61376	-12.876	0.00	2.044	Stationary at 1% level of significance
3	XRia has a unit root	constant	-3.527	-2.903	-2.589227	-2.925	0.0475	2.084	Stationary at 5% level of significance
		Constant, Linear Trend	-4.094	-3.475	-3.165046	-4.056	0.0111	2.018	Stationary at 5% level of significance
		none	-2.598	-1.945	-1.61376	-0.748	0.3888	2.249	Non stationary

*MacKinnon (1996) one-sided p-values.

Table 4.10: Unit Root Test for Errors in Cointegration models for Exchange Rate Scenario

SN	Null Hypothesis	Exogenous	Critical AEG τ Values			t-Statistic	DW	Remarks
			1% level	5% level	10% level			
1	u_t has a unit root	none	-4.500	-3.862	-3.539	-3.672	2.057	Non stationary, i.e. Errors are not I(0), Equation (7'.b)
2	u_t has a unit root	none	-4.053	-3.422	-3.104	-3.641	2.080	Stationary at 5 and 10% level of significance, Equation (7'.c)

Critical AEG Values taken from Annex II (Table VIII)

The estimated cointegrating regressions and ECM equations are as given below;

$$XRni_t = 1.4 - 5.57e\text{-}05\ TBia_t + 0.003\ XRia_t \ \dots\dots\dots\dots\dots\dots\ (7'.b)$$
$$t: \quad (32.482) \quad (-1.924) \quad (3.74)$$
$$(N= 72,\ R^2 = 0.22,\ DW= 0.673)$$

All the constant values are significant at 5% level of significance, but there is correlation as the DW value is very lower. Practically trade balance and exchange rate are interrelated so this is true phenomenon as shown by the statistic. It should be noted that this regression (7'.b) may not help to draw efficient inferences. To take care of the autocorrelation, the regression among the same variables have been done using the Prais- Winston procedure as already explained above. The corrected estimation obtained is given as below;

$$XRni_t = 1.45 - 4.5\text{e-}05\ TBia_t + 0.002\ XRia_t + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (7'.b')$$

t: *(39.17)*   *(-1.43)*   *(3.51)*

(N= 72, R^2= 0.84, DW= 2.048)

All the constants of the regressors are significant at 5% level of significance with only some small deviations in the t values. After corrective actions taken there seems little changes in the t values and the coefficients of the regressors whereas significant improvements have been observed in the degree of fitness and DW values. So the both the equations (7'.b) and (7'.b') reveal the same scenario that there is clear negative relationship of XRni with TBia and positive relationship with XRia. This means increase in trade balance between India and US results in decrease in real exchange rate between Nepal and India. In other words, higher the export of India to US lower will be the real exchange rate of NRs with IRs (i.e. appreciation of NRs). Nominal rate is fixed to IRs as 1.6 NRs per IRs. RER will vary again with changes in relative price levels of the participating economies. The ratio of foreign to domestic price (or foreign CPI to domestic CPI) also plays significant role to vary RER. Higher relative ratio will appreciate the real exchange rate. If CPI values of India and Nepal is compared after 2005, quarterly CPI indices of Nepal are relatively lower which used to be higher in periods before 2005. Meanwhile the CAB was in surplus most often after 2002 onwards lest the trade balances were always in deficit. From this we can infer that the real exchange rate of NRs with IRs is appreciated unrealistically since the trade or merchandise balance was always in deficit as can be clearly observed from the figures 7 and 8 in Annex II. The empirical finding is true because if trade balance of India with US is unfavorable or in deficit, there will be decline in export from India which can result in appreciation of IRs with respect to USD (i.e. XRia). Since XRni is just the reflection of XRia, XRni will also appreciate.

$$\Delta XRni_t = -0.0003 - 5.448e\text{-}05\Delta TBia_t + 0.0024\Delta XRia_t - 0.33u_{t-1} \;..\ldots\ldots\ldots.(8'.b)$$

$$t: \; (-0.06) \quad\quad (-1.82) \quad\quad (-3.77) \quad\quad (-3.55)$$

$$(N = 71, \; R^2 = 0.33, \; DW = 2.023)$$

Except the constant (α_0) other constants of variables (α_1) and (α_2) are significant at 10% and 1% level of significance respectively. The short- run (ECM) result shows that 0.33 of the discrepancy between XRni with TBia and XRia in the previous quarter is eliminated in this month.

The value of R^2 $(=0.84)$ clearly reveals that 84% of variations in the variables- trade balance between India-US and the exchange rate between IRs- USD is reflected in the real exchange rate of NRs with IRs. The reasons behind some margin of 16% for non-explanatory behavior can be that India has more open economy with capital account liberalization. Consideration of capital account related transactions (like FDI, international share transactions and other cross border financial transactions) that have impact on exchange rates have not been included in the model.

Similarly the estimation with only the exchange rates involved is given below;

$$XRni_t = 1.43 \, {}_+ \, 0.0033 \; XRia_t \;\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(7'.c)$$
$$t: \quad (-33.100) \quad (3.90)$$
$$(N = 72, \; R^2 = 0.18, \; DW = 0.65)$$

Using the Prais- Winston method to minimize the effect of autocorrelation, we get the following regression among the same variables;

$$XRni_t = 1.46 + 0.003 \; XRia_t \;\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(7'.c')$$
$$t: \quad (-39.69) \quad (3.96)$$
$$(N = 72, \; R^2 = 0.84, \; DW = 2.07)$$

This estimation clearly reveals the positive relationship of XRia with XRin, however, the small coefficient of XRia indicates that change in one unit of it is able to change XRni by 0.003 only. It means that appreciation or depreciation of Indian Rs with

respect to USD by one Rupee will cause appreciation or depreciation of Nepalese Rs by 0.3 Paisa. The smaller coefficient for XRia definitely confirms XRni just as fixed exchange rate that is the cross reflection of XRia.

Again, as depicted in Table 10 above, the error in equation (7'.c) or (7'.c') are I(0) indicating that there exists cointegration relationship XRni and XRia and there will be corresponding short- run equilibrium relationship as depicted through ECM given as under;

$$\Delta XRni_t = -0.00012 + 0.0027 \, \Delta XRia_t - 0.32 \, u_{t-1} \, \ldots\ldots\ldots\ldots\ldots\ldots\ldots..(8'.c)$$

$$t: \quad (-0.03) \quad (4.40) \quad (-3.56)$$

$$(N=72, \, R^2 = 0.31, \, DW = 2.05)$$

The coefficients for $\Delta XRia$ and lagged error being very small, the short- run changes are very slowly reflected in XRni.

Though the economies are liberal and transactions take place in different forms rather than only in terms of capital account, other significant variables from capital account should also be included in the model. Empirical studies that include transactions like FDI, international financial investments (like bonds, debentures, and shares) and other cross border financial transactions that have impact on exchange rates could provide better analysis.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Summary of Findings

Basically this study focuses on the feasibility of CAC promulgation with reference to the influences of variables capital account balance, current account balance and foreign exchange rates upon each other. Further considerations have also been given to the current trends in international reserve and real economic scenario of exchange rate system in Nepal. In brief, whether to opt for CAC or not is the issue need to be resolved considering the current economic status of Nepal. In view of these, specific objectives are to present the time series analysis of interdependence between capital account balance, current account balance and real effective exchange rate in Nepal, to examine the foreign exchange reserve trend and finally to examine the economic scenario of exchange rate of Nepalese currency with Indian currency. Discussions regarding current status and prospects of CAC, its challenges, costs and benefits have been discussed in the introduction part. Some important literatures about CAC, exchange rate and international reserves have been presented in literature review section, followed by the research methodologies that gives detail explanation of the theories behind the models for the above mentioned three cases. The VAR and Granger Causality approaches have been selected to analyze the interdependence among KA, CA and XR with quarterly time series data. However, for other two cases regarding international reserve and exchange rate scenario of Nepalese currency with Indian currency similar approaches of cointegration has been chosen.

As observed from the estimations, there is inverse relationship between KA and XR. An increase in XR (depreciation) by one unit in the previous quarter will lead to decrease in KA by 210 units in current quarter. Similarly, the VAR estimation with

CA as independent variable contains first lag of CA (coefficient= 0.37) and the third lag of XR (coefficient= 290) as significant variables to influence CA in the current period. It shows positive relations of CA at current quarter with its value in the previous quarter as well as the XR in the previous third quarter. Next, in addition to CA and KA, XR is observed to be dependent on its past values. The influence of XRs in nearer lags are stronger than with farther lags. From these, it is interesting to note that estimations with KA and CA as dependent variables, KA is negatively related to XR whereas CA is positively related with XR. The reason behind this contradiction requires further study and has been left out as it is not under the scope of this study. From the VAR equations, it can be also ensured that XR can be forecast with least errors as the data fitness is the largest, i.e. 86% among three models. The values of R^2 are relatively lower due to exclusion of lags that (might) have partial influences. The VAR models are stable and not spurious in nature.

In the same way, we found M2 and XRu as the most significant variables to impact the reserve levels. The long- run elasticity's of M2 and XRu with respect to IR are 0.29 and 0.002 respectively. So for Nepal, the higher supply of money is the main cause for increment in reserve level. At the same time additional reason behind holding reserve seems to avoid risk due to fluctuation in exchange rates. The other variables KAg and CAg seem to have insignificant influence on the level of reserve in direct terms. As only 51% of changes in the regressors (M2g and XRu) are reflected in reserve level, further study is required to find out other important missing variables and to determine which one is the cause for the other. Short run behavior shows that 0.318 of the discrepancy in the values of IRg with M2g and XRu in the previous year is eliminated in this year. Short- run changes in XRu is very slowly reflected in IRg keeping changes in M2g constant as the slope coefficient or the coefficient for XRu is

very small (i.e. 0.002). The similar is the case with M2g but its change is very promptly reflected in IRg as the slope coefficient (i.e. 0.44) is greater than for XRu. It can be ensured that IR is more sensitive to money supply. Though the money supply seem to have direct impact, it is likely to have influenced with current account, especially due to trade related transaction and inflow of cash due to remittance as well as FDI via capital account.

Again, there is clear negative relationship of XRni with TBia and positive relationship with XRia. This means increase in trade balance between India and US results in decrease in real exchange rate between Nepal and India. In other words, higher the export of India to US lower will be the real exchange rate of NRs with IRs (i.e. appreciation of NRs). Nominal rate is fixed to IRs as 1.6 NRs per IRs. RER will vary again with changes in relative price levels of the participating economies. The ratio of foreign to domestic price (or foreign CPI to domestic CPI) also plays significant role to vary RER. Higher relative ratio will appreciate the real exchange rate. If CPI values of India and Nepal is compared after 2005, quarterly CPI indices of Nepal are relatively lower which used to be higher in periods before 2005. Meanwhile the CAB was in surplus most often after 2002 onwards lest the trade balances were always in deficit. From this we can infer that the real exchange rate of NRs with IRs is appreciated unrealistically since the trade or merchandise balance was always in deficit as can be clearly observed from the figures 7 and 8 in Annex II. The empirical finding is true because if trade balance of India with US is unfavorable or in deficit, there will be decline in export from India which can result in appreciation of IRs with respect to USD (i.e. XRia)

The short- run (ECM) result shows that 0.33 of the discrepancy between XRni with TBia and XRia in the previous quarter is eliminated in this month. The value of R^2

(=0.84) clearly reveals that 84% of variations in the variables- trade balance between India-US and the exchange rate between IRs- USD is reflected in the real exchange rate of NRs with IRs. The reasons behind some margin of 16% for non- explanatory behavior can be that India has more open economy with capital account liberalization. Consideration of capital account related transactions (like FDI, international share transactions and other cross border financial transactions) that have impact on exchange rates have not been included in the model. Now, if the relationship among only the exchange rates XRni and XRia are observed, the similar propositions as described above is found to hold true. The estimation clearly reveals the positive relationship of XRia with XRin, however, the small coefficient of XRia indicates that change in one unit of it is able to change XRni by 0.003 only. It means that appreciation or depreciation of Indian Rs with respect to USD by one Rupee will cause appreciation or depreciation of Nepalese Rs by 0.3 Paisa. The smaller coefficient for XRia definitely confirms XRni just as fixed exchange rate that is the cross reflection of XRia. The coefficients for ΔXRia and lagged error being very small, the short- run changes are very slowly reflected in XRni.

Though the economies are liberal and transactions take place in different forms rather than only in terms of capital account, other significant variables from capital account should also be included in the model. Empirical studies that include transactions like FDI, international financial investments (like bonds, debentures, and shares) and other cross border financial transactions that have impact on exchange rates could provide better analysis.

5.2. Conclusion

There is negative relationship between capital account balance and real effective exchange rate whereas positive relationship between current account balance and real effective exchange rate. So, there is need to find out the reason behind this contradiction. At the same time as there is no any linkage between current and capital account balance, significant performance of current account convertibility cannot be ascertained because if the current account performances in real productive sectors are favorable, then capital investment should increase. But there is no provision for capital mobility so significant capital injection is absent.

Increase in trade balance between India and US results in decrease in real exchange rate between Nepal and India. In other words, higher the export of India to US there will be appreciation of NRs with respect to IRs. Nominal rate is fixed to IRs as 1.6 NRs per IRs. Since exchange rate of NRs with IRs is just the reflection of exchange rate of IRs with USD, exchange rate of NRs with respect to IRs will also appreciate. It is important to find out gain or loss of Nepal in trade with its trade partners considering the real economic status

Further, due to standstill industrial growth resulting in sluggish export performance and subsistence agriculture sector, demand is not balanced through domestic supply of goods. This has ultimately made Nepalese economy to depend on excessive import thereby leading to prolonged trade deficit. Therefore, it is of utmost importance to assess the achievement or loss due to current account convertibility.

With no provision of financial liberalization via capital account, the reserve trend confirmed the reason behind holding the international reserve as risk prevention for exchange rate volatility. Money supply seems to have positive influence which is

likely that growth in it will increase investment and consumption thereby enhancing investment in productive sector. Investment in productive sector improves export earning those results with increase in reserve accumulation. The opposite will be the scenario if money supply is inefficient.

To ensure safeguard against foreign exchange requirement, export sectors should be improved. In the words of Michael P. Todaro, there should be emphasize for true long- term economic investments in plants, equipments, physical and social infrastructure, etc and not for the speculative capital. Further, LDCs (Least Developed Countries) like Nepal needs to focus first on putting fundamental conditions for development into place, because evidence shows that both MNCs (Multinational Corporations) and portfolio investors follow growth rather than lead it. We must recognize that multinational corporations are not in the development business; their objective is to maximize their return on capital. That is why over 90% of global FDI (Foreign Direct Investment) goes to industrial countries and the fastest growing LDCs. MNCs seek out the best profit opportunities and are largely unconcerned with issues such as poverty, inequality and unemployment (Todaro, 2007).

5.3. Recommendations

With due consideration from the empirical finding and the conclusions drawn above, the following should be the policy targets to get prepared for capital account convertibility;

   1. There should be sincere assessment regarding the achievement of full current account convertibility. There should be some kind of policy sequencing to maintain current and capital account balance as they are observed independent to each other and their relationship with exchange rates are just opposite.

Before moving to capital account convertibility, performance of current account convertibility should be enhanced by putting emphasize for true long- term economic investments in plants, equipments, physical and social infrastructure and not for the speculative capital. Nepal needs to focus first on putting fundamental conditions for development into place, because evidence shows that both MNCs and portfolio investors follow growth rather than lead it.

2. Objective behind reserve holding should also be precautionary motive so as to avoid risks due to volatility and international capital movements. At the same time transaction motive should be maintained through efficient supply of money to productive channels that help to enhance export earnings.

3. Exchange rate needs to be revalued to reflect the real economic condition of the Nepalese economy. This can at least help to minimize some deficits in current account. However, as the appreciation of NRs with respect to IRs is significantly higher, it needs to be readjusted step by step so as to avoid any unfavorable counter economic shocks. It is important to establish the key determinants of the real exchange rate and show how each of these contributes to changes in the real exchange rate which, in turn, impacts upon the incentives for exporting.

ANNEXES

ANNEX I: TABLES AND FIGURES RELATED WITH VAR ANALYSIS

Table I:VAR Lag Order Selection Criteria considering 12 lags

Endogenous variables: CA KA XR					
Exogenous variables: C					
Included observations: 60					
Lag	LR	FPE	AIC	SC	HQ
0	NA	3.07E+16	46.47651	46.58123	46.51747
1	107.4652	6.08E+15*	44.85749*	45.27636*	45.02133*
2	8.830496	6.97E+15	44.99088	45.7239	45.2776
3	18.33469	6.56E+15	44.92418	45.97136	45.33379
4	6.888986	7.74E+15	45.07761	46.43893	45.6101
5	21.88358*	6.47E+15	44.88026	46.55573	45.53563
6	5.394887	7.88E+15	45.04867	47.0383	45.82693
7	4.989322	9.70E+15	45.21738	47.52115	46.11851
8	10.97334	1.01E+16	45.20385	47.82178	46.22787
9	11.1861	1.03E+16	45.15429	48.08637	46.30118
10	5.674494	1.26E+16	45.25861	48.50485	46.52839
11	14.1517	1.12E+16	45.01432	48.5747	46.40698
12	8.705203	1.22E+16	44.93583	48.81037	46.45137

Table II: VAR Lag Order Selection Criteria considering 5 lags

Endogenous variables: CA KA XR					
Exogenous variables: C					
Included observations: 67					
Lag	LR	FPE	AIC	SC	HQ
0	NA	2.92E+16	46.42512	46.52384	46.46418
1	111.4155	6.51E+15	44.92528	45.32015*	45.08153*
2	7.646916	7.51E+15	45.06648	45.75751	45.33992
3	20.16797	6.93E+15	44.98132	45.96849	45.37194
4	11.02645	7.45E+15	45.04578	46.32911	45.5536
5	24.68163*	6.09E+15*	44.83048*	46.40996	45.45549

 * indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Table III: Vector Autoregression Estimates of Equation (4.a)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: KA				
Method: Least Squares				
Included observations: 67 after adjusting endpoints				
C	-903.9192	2927.459	-0.308773	0.7588
CA(-1)	0.001192	0.135942	0.008766	0.993
CA(-2)	-0.182479	0.139055	-1.312275	0.1953
CA(-3)	-0.137393	0.13798	-0.995746	0.3241
CA(-4)	-0.100603	0.139457	-0.721388	0.474
CA(-5)	0.202313	0.128697	1.572012	0.1221
KA(-1)	0.171261	0.151608	1.129626	0.2639
KA(-2)	0.199395	0.151429	1.316752	0.1938
KA(-3)	0.233042	0.166449	1.400086	0.1675
KA(-4)	-0.119007	0.164388	-0.723936	0.4724
KA(-5)	0.01875	0.167404	0.112003	0.9113
XR(-1)	-210.5588	124.7375	-1.688015	0.0975*
XR(-2)	69.26031	134.3144	0.515658	0.6083
XR(-3)	99.55618	128.8299	0.772772	0.4432
XR(-4)	-50.58164	132.8447	-0.380758	0.705
XR(-5)	140.4468	121.4108	1.15679	0.2527
R-squared	0.346404	Mean dependent var		1177.757
Adjusted R-squared	0.15417	S.D. dependent var		4326.123
S.E. of regression	3978.694	Akaike info criterion		19.62004
Sum squared resid	8.07E+08	Schwarz criterion		20.14653
Log likelihood	-641.2713	F-statistic		1.80199
Durbin-Watson stat	1.799976	Prob(F-statistic)		0.060382

* indicates that the coefficients are significant at 5% level of significance

Table IV: Vector Autoregression Estimates of Equation (5.a)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: CA				
Method: Least Squares				
Included observations: 67 after adjusting endpoints				
C	-4538.101	2976.934	-1.524421	0.1336
CA(-1)	0.367939	0.13824	2.661603	*0.0104
CA(-2)	-0.102162	0.141405	-0.722477	0.4733
CA(-3)	0.061918	0.140312	0.441292	0.6609
CA(-4)	0.135722	0.141814	0.957046	0.3431
CA(-5)	-0.116079	0.130872	-0.886971	0.3793
KA(-1)	0.079139	0.154171	0.513322	0.6099
KA(-2)	0.018984	0.153989	0.123283	0.9024
KA(-3)	0.042287	0.169262	0.24983	0.8037
KA(-4)	-0.272588	0.167167	-1.630636	0.1091
KA(-5)	-0.179738	0.170233	-1.055837	0.296
XR(-1)	161.4012	126.8456	1.272422	0.209
XR(-2)	38.85053	136.5843	0.284444	0.7772
XR(-3)	289.6958	131.0072	2.211297	*0.0315
XR(-4)	-185.1064	135.0898	-1.370248	0.1766
XR(-5)	-153.7131	123.4626	-1.245017	0.2188

R-squared	0.560402	Mean dependent var	-734.7298
Adjusted R-squared	0.431108	S.D. dependent var	5364.189
S.E. of regression	4045.935	Akaike info criterion	19.65356
Sum squared resid	8.35E+08	Schwarz criterion	20.18005
Log likelihood	-642.3942	F-statistic	4.334336
Durbin-Watson stat	2.087437	Prob(F-statistic)	0.00004

* indicates that the coefficients are significant at 5% level of significance

Table V: Vector Autoregression Estimates of Equation (6.a)

Dependent Variable: XR
Method: Least Squares
Included observations: 67 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.616818	2.736411	2.052622	0.0453*
CA(-1)	-0.0000915	0.000127	-0.719684	0.475
CA(-2)	-0.0000951	0.00013	-0.731927	0.4676
CA(-3)	0.000112	0.000129	0.870595	0.3881
CA(-4)	-0.0000869	0.00013	-0.666372	0.5082
CA(-5)	0.000379	0.00012	3.147022	0.0028*
KA(-1)	-0.0000138	0.000142	-0.097719	0.9225
KA(-2)	0.000116	0.000142	0.822942	0.4144
KA(-3)	-0.000325	0.000156	-2.089879	0.0416*
KA(-4)	-0.000092	0.000154	-0.598961	0.5519
KA(-5)	0.000166	0.000156	1.063401	0.2926
XR(-1)	0.735959	0.116597	6.311988	0*
XR(-2)	-0.018884	0.125549	-0.150413	0.881
XR(-3)	0.189651	0.120422	1.574881	0.1215
XR(-4)	0.247519	0.124175	1.993305	0.0516*
XR(-5)	-0.329452	0.113487	-2.902986	0.0054*
R-squared	0.86351	Mean dependent var		29.69342
Adjusted R-squared	0.823366	S.D. dependent var		8.848988
S.E. of regression	3.719042	Akaike info criterion		5.669554
Sum squared resid	7.05E+02	Schwarz criterion		6.196048
Log likelihood	-173.9301	F-statistic		21.51023
Durbin-Watson stat	1.98799	Prob(F-statistic)		0

* indicates that the coefficients are significant at 5% level of significance

```
Date: 04/30/12   Time: 11:09
Sample: 1994:2 2010:4
Included observations: 67
```

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.037	0.037	0.0959	0.757
		2	-0.023	-0.024	0.1321	0.936
		3	-0.092	-0.090	0.7404	0.864
		4	-0.116	-0.111	1.7213	0.787
		5	0.012	0.015	1.7323	0.885
		6	0.183	0.173	4.2711	0.640
		7	-0.037	-0.069	4.3759	0.736
		8	-0.028	-0.033	4.4375	0.816
		9	0.090	0.131	5.0786	0.827
		10	0.049	0.078	5.2717	0.872
		11	0.038	0.012	5.3896	0.911
		12	-0.119	-0.153	6.5815	0.884
		13	-0.054	0.011	6.8351	0.910
		14	-0.036	-0.003	6.9484	0.937
		15	-0.072	-0.147	7.4150	0.945
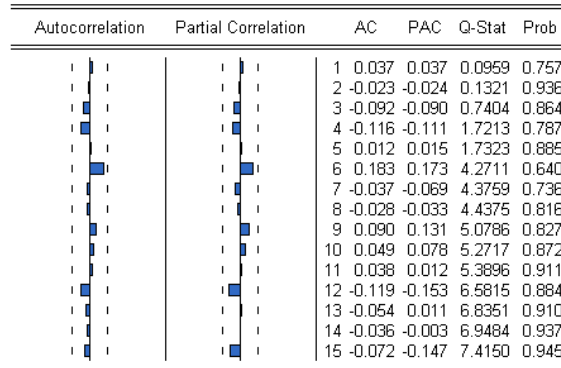
Figure 1: Correlogram for utx

```
Date: 04/30/12   Time: 11:04
Sample: 1994:2 2010:4
Included observations: 67
```

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.054	-0.054	0.2077	0.649
		2	-0.085	-0.088	0.7226	0.697
		3	-0.020	-0.030	0.7501	0.861
		4	0.127	0.118	1.9271	0.749
		5	0.006	0.017	1.9299	0.859
		6	-0.104	-0.085	2.7530	0.839
		7	-0.137	-0.147	4.2090	0.755
		8	0.028	-0.020	4.2684	0.832
		9	0.079	0.057	4.7617	0.855
		10	-0.026	0.004	4.8175	0.903
		11	-0.168	-0.134	7.1427	0.787
		12	-0.068	-0.109	7.5317	0.821
		13	0.105	0.034	8.4798	0.811
		14	0.064	0.056	8.8380	0.841
		15	-0.100	-0.040	9.7215	0.837
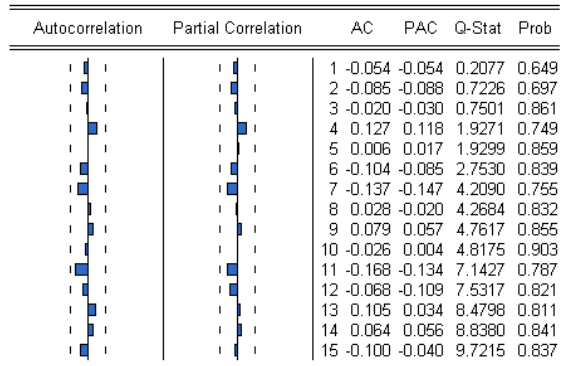
Figure 2: Correlogram for Vtx

```
Date: 04/30/12   Time: 11:12
Sample: 1994:2 2010:4
Included observations: 67
```

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.004	-0.004	0.0014	0.971
		2	0.029	0.029	0.0627	0.969
		3	0.082	0.082	0.5448	0.909
		4	0.033	0.033	0.6242	0.960
		5	-0.102	-0.107	1.3972	0.925
		6	-0.059	-0.071	1.6624	0.948
		7	-0.267	-0.274	7.1740	0.411
		8	-0.128	-0.132	8.4629	0.390
		9	0.050	0.079	8.6615	0.469
		10	-0.272	-0.245	14.645	0.146
		11	0.141	0.183	16.286	0.131
		12	0.129	0.105	17.688	0.125
		13	-0.007	-0.045	17.692	0.170
		14	0.053	-0.006	17.935	0.210
		15	0.037	-0.132	18.060	0.260
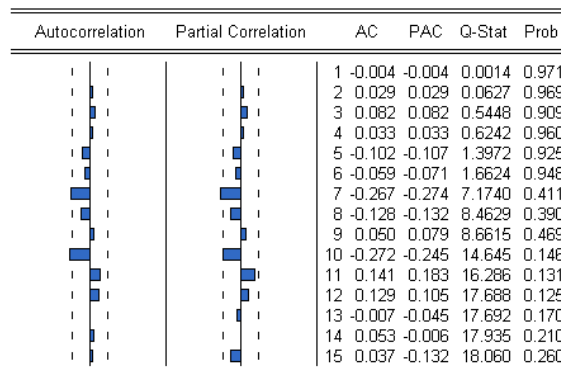
Figure 3: Correlogram for Wtx

Table V: Roots of Characteristic Polynomial

Endogenous variables: CA KA XR

Exogenous variables: C

Lag specification: 1 5

Root	Modulus
0.946914 - 0.076720i	0.950017
0.946914 + 0.076720i	0.950017
-0.011341 + 0.891096i	0.891168
-0.011341 - 0.891096i	0.891168
0.617837 - 0.608873i	0.867438
0.617837 + 0.608873i	0.867438
-0.826095	0.826095
-0.161455 - 0.796906i	0.813097
-0.161455 + 0.796906i	0.813097
-0.527041 - 0.567314i	0.77435
-0.527041 + 0.567314i	0.77435
0.675524 + 0.276849i	0.730053
0.675524 - 0.276849i	0.730053
-0.554513	0.554513
-0.425108	0.425108

VAR satisfies the stability condition

Inverse Roots of AR Characteristic Polynomial
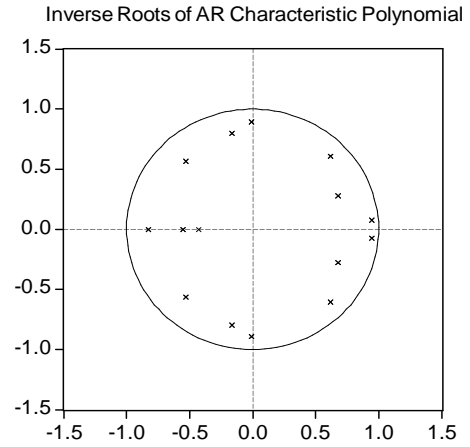
Figure 4: Roots lie inside unit circle

Table VI: VAR Residual Portmanteau Tests for Autocorrelations

H0: no residual autocorrelations up to lag h

Included observations: 67

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	0.882136	NA*	0.895502	NA*	NA*
2	3.413421	NA*	3.504672	NA*	NA*
3	6.724912	NA*	6.97139	NA*	NA*
4	10.47878	NA*	10.9636	NA*	NA*
5	16.42456	NA*	17.38888	NA*	NA*
6	24.56003	0.0035	26.32456	0.0018	9
7	33.47962	0.0146	36.28477	0.0065	18
8	40.74285	0.0436	44.53285	0.0182	27
9	47.14626	0.1011	51.92988	0.0417	36
10	60.6273	0.0598	67.77602	0.0157	45
11	70.07514	0.0697	79.07968	0.0147	54
12	75.75365	0.1301	85.99714	0.0287	63

*The test is valid only for lags larger than the VAR lag order.

df is degrees of freedom for (approximate) chi-square distribution

Figure 5: Plot of Real CA and KA

Figure 6: Plot of Real Effective Exchange Rate Index (XR)

Table VIII: Augmented Engle- Granger (AEG) Critical Values Calculation Table

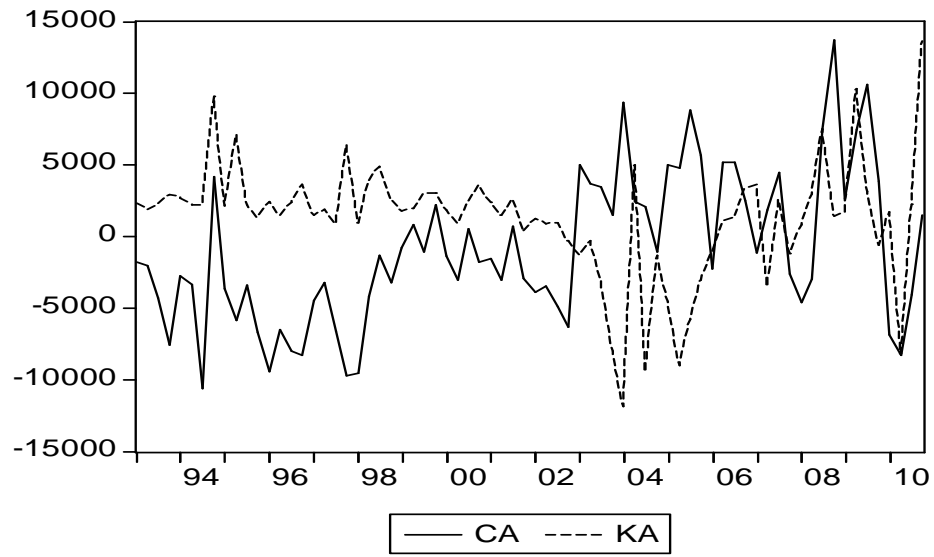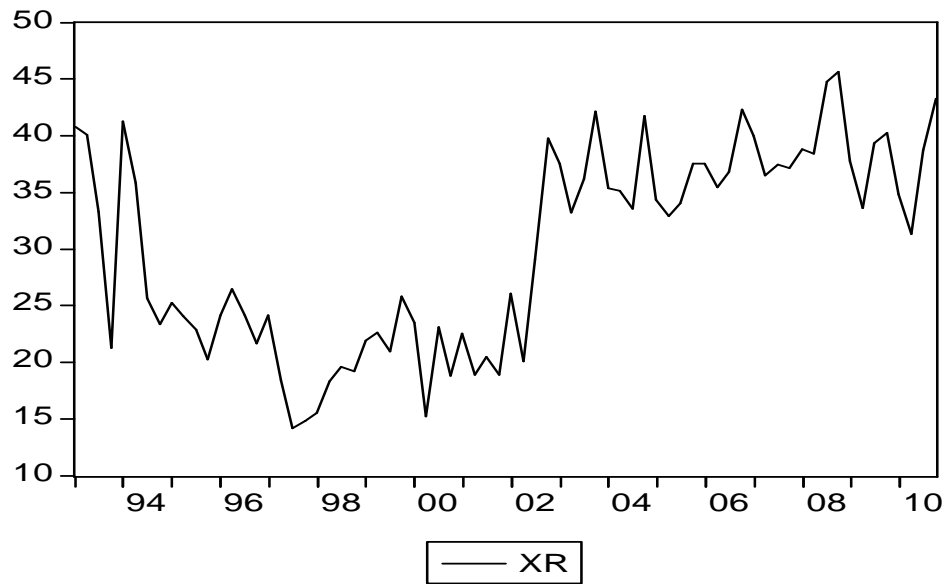| τ variant	Level of Significance	T (No. of samples)	No. of I(1) Series	$\beta\infty$	β_1	β_2	β_3	β_1/T	β_2/T^2	β_3/T^3	$C(p)= \beta\infty + \beta_1/T + \beta_2/T^2 + \beta_3/T^3$
Tc	1%	31	5	-4.95756	-21.8883	-45.142	0	-0.70607	-0.04697	0	-5.71061
Tc	5%	31	5	-4.41519	-14.0406	-12.575	0	-0.45292	-0.01309	0	-4.88120
Tc	10%	31	5	-4.13157	-10.7417	-3.784	0	-0.34651	-0.00394	0	-4.48201
Tc	1%	31	3	-4.29374	-14.4354	-33.195	47.433	-0.465658	-0.03454	0.0016	-4.79235
Tc	5%	31	3	-3.74066	-8.5631	-10.852	27.982	-0.276229	-0.01129	0.00094	-4.02724
Tc	10%	31	3	-3.45218	-6.2143	-3.718	0	-0.200461	-0.0038	0	-3.65651
Tc	1%	72	3	-4.29374	-14.4354	-33.195	47.433	-0.200492	-0.00640	0.00013	-4.50051
Tc	5%	72	3	-3.74066	-8.5631	-10.852	27.982	-0.118932	-0.00209	7.5E-05	-3.8616
Tc	10%	72	3	-3.45218	-6.2143	-3.718	0	-0.08631	-0.00072	0	-3.53921
Tc	1%	72	2	-3.89644	-10.9519	-22.527	0	-0.15211	-0.00434	0	-4.05289
Tc	5%	72	2	-3.33613	-6.1101	-6.823	0	-0.084863	-0.00132	0	-3.42231
Tc	10%	72	2	-3.04445	-4.2412	-2.72	0	-0.058906	-0.00052	0	-3.10388

Notes: All the values of $\beta\infty$, β_1, β_2 and β_3 for 1, 5 and 10% level of significances for corresponding number of I(1) series are adopted from James G. MacKinnon (2010):Queen's Economics Department Working Paper No. 1227 and other calculations by the author
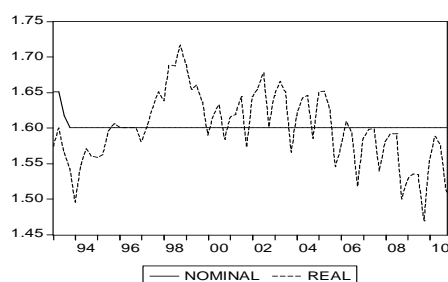

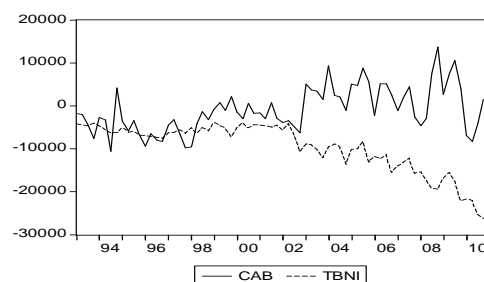Figure 7. Graph showing the Real and

Nominal Exchange rate NRs per IRs

Figure 8. Graph showing the Current

Account Balance and Trade Balance

Between Nepal and India

ANNEX III: TIME SERIES DATA

Table IX: Quarterly Time Series Data

Year	CA	KA	XR	CPIi	CPIa	CPIn	Trade Share India (%)	Trade Share ROW (%)	TBia	XRia	XRin
1993Q1	-1799.8	2297.4	40.8	76.7	141.3	80.4	64.6	-16	-345.0	55.4	1.6
1993Q2	-2005.8	1917.2	40.1	76.4	142.2	78.8	64.6	-21.1	-236.7	56.9	1.6
1993Q3	-4316.3	2250.8	33.3	76	143.6	78.5	52.6	-23.8	-391.9	60.1	1.6
1993Q4	-7591.9	2900.8	21.3	74.9	144.3	77.7	33.1	-17.5	-261.9	58.9	1.5
1994Q1	-2729.2	2667.9	41.2	81.7	145.2	87.4	62	-18.4	-302.6	55.8	1.5
1994Q2	-3354.6	2216.8	35.9	83.1	145.9	85.9	55.6	-2	-134.0	55.1	1.5
1994Q3	-10615.8	2180.3	25.7	83.5	147.1	85.1	40.2	7.3	-460.2	55.2	1.6
1994Q4	4152	9793.7	23.4	83	148	85.1	36.4	4	-352.8	55.9	1.6
1995Q1	-3624.4	2151.6	25.2	90.5	149.3	93	39.1	10.5	-499.8	51.7	1.6
1995Q2	-5837.6	7085.7	24	91.2	149.9	93.4	37.3	12	-324.1	51.6	1.6
1995Q3	-3383.2	2178.7	22.9	91.7	151.4	91.9	36.4	6.5	-353.8	52.0	1.6
1995Q4	-6650.7	1381.9	20.2	91.9	152.4	91.6	32.2	14.3	-251.7	50.7	1.6
1996Q1	-9407.8	2424.5	24.2	100	153.3	100	38.3	21.1	-314.9	50.8	1.6
1996Q2	-6480.3	1496.5	26.5	100	153.8	100	42	20.6	-244.6	54.1	1.6
1996Q3	-7970.3	2392.6	24.1	100	155.6	100	38.4	13.4	-319.5	54.6	1.6
1996Q4	-8282	3656.6	21.7	100	156.8	100	34.4	14.5	-335.6	55.1	1.6
1997Q1	-4502.1	1495.2	24.1	108.6	157.8	110	37.8	16.4	-388.3	51.8	1.6
1997Q2	-3202.4	1890	18.4	110.1	158.8	109.9	29.3	10.1	-247.3	51.7	1.6
1997Q3	-6638	886.3	14.2	110	159.9	108.1	22.9	8.3	-317.6	52.1	1.6
1997Q4	-9747.7	6406.7	14.8	106.5	160.3	103.3	24.3	9.1	-382.9	46.0	1.7
1998Q1	-9546	934.8	15.6	114.1	161.2	111.5	25.3	11.4	-505.6	51.1	1.6
1998Q2	-4172.4	3916.2	18.3	117.7	161.5	111.6	30.6	15.1	-373.7	53.0	1.7
1998Q3	-1337.6	4878.7	19.6	119.4	162.2	113.3	32.8	13.6	-496.9	53.5	1.7
1998Q4	-3213.1	2667.3	19.2	119.9	163	111.8	32.6	16	-458.4	56.8	1.7
1999Q1	-788.1	1760.7	21.9	133.1	163.7	126.2	36.7	14.2	-475.6	52.3	1.7
1999Q2	810.1	1951.8	22.6	135	164.1	130.7	37.3	9.4	-261.7	51.6	1.7
1999Q3	-1066.2	2975	20.9	129.7	165.2	125	34.5	16.7	-487.1	54.2	1.7
1999Q4	2181.2	3037.8	25.8	126.3	166.4	123.5	41.7	25.6	-438.4	40.2	1.6
2000Q1	-1376.2	1847.5	23.5	136.1	167.7	137	37.1	19.3	-587.7	53.6	1.6
2000Q2	-3031.7	974	15.3	136.8	168.5	135.2	24.4	17.2	-433.4	53.5	1.6
2000Q3	542.5	2449.7	23.1	135.8	170.8	133.1	37.4	18.3	-633.8	54.9	1.6
2000Q4	-1762	3607.2	18.8	132.7	172.2	134.1	29.4	21.3	-658.7	57.8	1.6
2001Q1	-1578.9	2359.9	22.6	140.5	173.5	139.2	36.1	22.6	-666.1	56.8	1.6
2001Q2	-3060.7	1489	18.9	140.7	174.4	139.1	30.2	20.7	-450.7	57.9	1.6
2001Q3	726.2	2611.2	20.5	139.3	176.3	135.6	33.3	26.3	-472.5	59.0	1.6
2001Q4	-2949.8	374	18.9	136.2	177.7	138.6	29.2	33.6	-470.6	39.9	1.6
2002Q1	-3905.6	1268.1	26.1	147.1	177.8	143.2	41.8	60.5	-567.5	57.5	1.6
2002Q2	-3451.9	886.2	20	147.7	177.1	142.9	32.1	58.7	-455.4	57.6	1.7
2002Q3	-4865.3	982.3	29.1	146.3	178.8	139.6	47.7	63.3	-557.9	59.6	1.7
2002Q4	-6294.4	-309	39.8	142.9	179.9	142.8	62.6	65.4	-634.1	61.6	1.6

Year	CA	KA	XR	CPIi	CPIa	CPIn	Trade Share India (%)	Trade Share ROW (%)	TBia	XRia	XRin
2003Q1	5017.1	-1225.4	37.5	153.1	181	148.9	60.7	60.2	-713.1	57.3	1.6
2003Q2	3711.1	-314.4	33.2	152.8	181.3	146.8	54.2	63.6	-518.4	57.1	1.7
2003Q3	3444.2	-3107.3	36.2	152.7	183.7	148	58.7	67	-632.7	57.3	1.7
2003Q4	1492.5	-8008.2	42.2	149.2	183.7	152.5	64.9	63.4	-588.6	37.6	1.6
2004Q1	9344	-11841.8	35.4	157.8	184.9	156.2	56.2	57.5	-696.0	53.6	1.6
2004Q2	2425.2	5026.3	35.2	158.4	184.7	154.4	56.5	70.3	-539.2	53.1	1.6
2004Q3	2088.6	-9406	33.5	157.7	187.2	153.3	53.9	68.9	-750.1	53.1	1.6
2004Q4	-1063.4	-1290.1	41.7	153.7	189.4	155.2	64.9	72.3	-651.6	56.2	1.6
2005Q1	5033.4	-4513.2	34.4	165.2	190.1	160.2	55.5	66.6	-714.0	53.0	1.7
2005Q2	4768.1	-9024.4	32.9	165	190.7	159.8	53	75.2	-633.2	51.2	1.7
2005Q3	8842.7	-5773.2	34	164.7	193.2	162.1	53.7	83.5	-688.8	51.3	1.6
2005Q4	5647	-3054.8	37.5	159.4	194.8	165.1	56.5	78.3	-704.6	37.3	1.5
2006Q1	-2240.5	-1030.4	37.6	171.4	198.1	174.7	57.5	78.5	-886.1	51.0	1.6
2006Q2	5165.7	1080.3	35.4	173.6	197.6	172.7	55.5	80.2	-841.1	51.5	1.6
2006Q3	5171.6	1346.3	36.8	173	200	173.7	57.3	76.7	-747.8	51.5	1.6
2006Q4	2494.2	3338.1	42.3	170.4	203	179.7	62.9	73.9	-760.9	54.8	1.5
2007Q1	-1131	3654.4	40	183.1	202.9	184.9	61.9	77.6	-865.4	51.0	1.6
2007Q2	1825.1	-3430.6	36.5	185.1	201.9	185.4	56.7	79.7	-751.6	48.7	1.6
2007Q3	4447.2	2541	37.4	185	205.2	185.2	58.2	76.8	-824.2	48.2	1.6
2007Q4	-2613.9	-1193.9	37.2	181	208.2	188.2	55.7	69.6	-419.7	35.1	1.5
2008Q1	-4595.6	808.7	38.8	194.7	208.4	197.1	59.7	72.3	-436.8	43.1	1.6
2008Q2	-2959.3	2986.2	38.4	195.2	210.4	196.3	59.4	73.5	-592.7	42.5	1.6
2008Q3	7534.5	7504.9	44.8	197.9	213.3	199	69.5	77.6	-634.7	43.2	1.6
2008Q4	13700.8	1430.9	45.7	195.4	218.5	208.5	67	72.7	-239.6	47.6	1.5
2009Q1	2637.5	1715.6	37.7	213.7	218.1	223.8	56.4	59.9	-333.7	46.7	1.5
2009Q2	7481.5	10323.6	33.6	215.2	211.3	224.4	50.4	58.5	-485.6	47.9	1.5
2009Q3	10601.7	3185.8	39.4	215.3	212.7	224.7	58.9	71.9	-369.2	49.6	1.5
2009Q4	3904.6	-592.9	40.2	214.8	215	234	57.9	60.8	-85.9	30.6	1.5
2010Q1	-6872.4	1724.9	34.8	238.6	216	245.8	52.8	56.2	-172.8	43.3	1.6
2010Q2	-8273	-8150.9	31.3	247.2	216.3	249.1	48.3	54.9	-344.5	40.6	1.6
2010Q3	-4066.1	2246.7	38.7	246.2	217.8	250.1	59.3	66.1	-513.8	40.2	1.6
2010Q4	1494.6	13653.9	43.3	242.6	218.1	257.1	63.7	70.8	-458.8	41.7	1.5

Sources**:**

 1. KA, CA, Exchange Rates with Indian Rupees and USD, XRni, TBni are from various Quarterly Bulletins, NRB

 2. CPI for India is from Labor Bureau, Government of India and calculation by the author.

 3. CPI for USA is from Bureau of Labor Statistics (BLS) and calculation by the author.

 4. 1993 stands for FY 1992/93 and similar convention for other fiscal years.

 5. TBia is from U.S. Census Bureau, Foreign Trade (http://www.census.gov/foreign-trade/data/)and calculation by the author.

 6. XRia is from RBI, India (http://www.rbi.org.in).

 7. 1993 stands for FY 1992/93 and similar convention for other fiscal years.

Notes:

 *Exchange rate (XR) is the average of buying and selling rate.

 * Real values of TBia is in million USD

 *Real values of CA, KA and TBni are in Million NRs.

Table X: Yearly Time Series Data

Year	CAg	KAg	M2g	IRg	XRu
1980	-0.01462892	0.0247227	0.2263415	0.0955334	30.530512
1981	-0.0108214	0.0232102	0.2309921	0.0832314	29.947705
1982	-0.01265974	0.0249806	0.2406738	0.0948948	31.760974
1983	-0.049419	0.0274297	0.2726827	0.064309	30.927832
1984	-0.03419191	0.0306312	0.2661033	0.0460384	33.733829
1985	-0.03968916	0.0272651	0.263949	0.0273258	38.985171
1986	-0.04433355	0.0325024	0.2719869	0.0338261	38.455325
1987	-0.04547753	0.0295673	0.2739895	0.0413664	37.748439
1988	-0.06010965	0.0567965	0.2785552	0.0668846	36.31463
1989	-0.070799	0.0663372	0.2980308	0.0697959	40.515695
1990	-0.07497982	0.0569429	0.3051022	0.0836913	43.251344
1991	-0.07892065	0.0523385	0.3133041	0.093936	46.364823
1992	-0.06739041	0.0490076	0.3055146	0.1334499	52.755499
1993	-0.05815346	0.0319244	0.3401247	0.1539291	53.433914
1994	-0.04028263	0.0538124	0.3501601	0.175847	54.253118
1995	-0.05377484	0.040172	0.3694979	0.1584956	52.551661
1996	-0.0865451	0.0297333	0.3722272	0.1335706	55.21
1997	-0.05884932	0.0299102	0.3697533	0.1308858	54.221949
1998	-0.05048513	0.0298433	0.420358	0.1460796	55.3283
1999	0.000687355	0.0208156	0.4467372	0.1565268	55.460784
2000	0.053093905	0.0223601	0.4904524	0.1711243	56.175878
2001	-0.02480935	-0.0506187	0.4857191	0.1694756	60.574863
2002	0.039528516	-0.0688647	0.4875214	0.1743778	62.325665
2003	0.023596035	-0.0239826	0.499585	0.185107	61.53769
2004	0.02719707	-0.0374251	0.5166476	0.2013608	57.416498
2005	0.019586639	-0.0406563	0.5097283	0.182457	55.266974
2006	0.021747207	0.0027252	0.530244	0.1979146	53.368637
2007	-0.00123958	0.0028685	0.5434234	0.1939323	50.077196
2008	0.029031107	0.0232266	0.6073306	0.1981936	44.592572
2009	0.041800294	0.0244935	0.6360446	0.2233152	46.92388
2010	-0.02735127	0.0156226	0.6084478	0.179228	41.703537

Source: KA, CA and Exchange rate of NRs per USD are from various Quarterly Bulletins, NRB

Notes: * Real values of GDP, CA and KA are in Million Rs.

*1993 stands for FY 1992/93 and similar convention for other fiscal years.

*Calculation to convert to real values of all the variables by author.

REFERENCES

Bastourre, Diego; Carrera, Jorge and Ibarlucia, Javier, "Why Countries Accumulate Foreign Reserves? A Dynamic Panel Approach", Banco Central de la Republica Argentina, Buenos Aires, Argentina and Universidad Nacional de La Plata, La Plata, Argentina, n.d.

Beja, Edsel L. Jr,"Balance of Payments- Consistent Unreported Flows", 2010, THE IDEAs WORKING PAPER, Manila University, Quezon City 1108, Philippines.

Broda, Christian, "Terms of Trade and Exchange Rate Regimes in Developing Countries", 2000, Department of Economics, MIT.

Chakraborty, Debashis; Mukherjee, Jaydeep and Sinha, Tanaya , "The Structural Relationship between Current and Capital Account Balance in India: A Time Series Analysis", n.d.

Chakravarty, Suvojit Lahiri, "The Optimal Level of International Reserves – The case of India", 2008

Chaulagai, Mahesh Kumar, "Issues on Capital Account Convertibility and Nepal", 2008,   Mirmire, Banker's Club, Nepal Rastra Bank, Kathmandu.

Cheung, Yin-Wong and Qian, Xingwang " Capital Flight: China's Experience", 2010, CESifo Working Paper No. 2931

Cooper, Richard N., "Currency Convertibility in transforming Economies: Was It a Mistake?" 1996, The Weatherhead Center for International Affairs, Harvard University, Working Paper Series 96-05, December 1996

Cooper, Richard N., "Should Capital account convertibility be a world objective?" 1998, Essays in International Finance, No. 7, May1998

 Dr. Ishfaq, Mohammad, "Overview of Different Exchange Rate Regimes and Preferred Choice for UAE", 2010, Economics Paper Series, Department of Finance, Government of Dubai.

Dr. Jadhav, Narendra, "Capital Account Liberalisation: The Indian Experience", 2003, Paper Presented at A Tale of Two Giants: India's and China's Experience with Reform and Growth, New Delhi, India.

Dunn, Robert M., Jr & Mutti, John H., "International Economics", 2004, Routledge, London, UK.

"Eviews 4 User's Guide", 2002, Quantitative Micro Software, LLC

Fischer, Stanley, "Should the IMF Pursue Capital- account convertibility?" 1998, Essays in International Finance, No. 7, May1998

"Forty Years of Nepal Rastra Bank", 1996, Nepal Rastra Bank.

Francesco Caramazza, Francesco and Aziz, Jahangir, "Fixed or Flexible? Getting the Exchange Rate Right in the 1990s", 1998, International Monetary Fund, Publication Services.

Gaudel, Yadav Sharma, "Monetary System of Nepal", 2003, Adroit Publishers, Delhi, India

Grenville, Stephen, "Regional and Global Responses to the Asian Crisis", 2007, Asian Economic Policy Review (2007), Lowy Institute for International Policy and the Australian National University

Guerin, Selen Sarisoy, "The relationship between capital flows and current account: volatility and causality", ECARES, Université Libre de Bruxelles.

Guitian, Manuel, "Capital Account Convertibility and the Financial Sector", 1998, Journal of Applied Economics, Vol. I, No. 1.

Gujarati, Damodar N. and Sangeetha, "Basic Econometrics", 2007, Fourth Edition, Tata McGraw-Hill Education Private Limited.

Ho-Don, Yan, "Casual Relationship between Current Account and Financial Account", 2005, International Advances in Economic Research.

http://commerce.nic.in/eidb/default.asp (Ministry of Commerce and Industry, Department of Commerce, Government of India)>>data for export/import to Nepal)

http://labourbureau.nic.in/indtab.html (The source of the data is the Labour Bureau, Government of India)

http://www.census.gov/foreign-trade/data/ (Department of Commerce, U.S.)

http://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/ (The source of the data is the U.S. Department of Labor, Bureau of Labor Statistics (BLS).)

http://www.x-rates.com/d/INR/USD/hist2011.html (For Historical Exchange rate of USD and Indian Rs), Source: U.S. Census Bureau, Foreign Trade

Hanif, Melanie, "Indian Involvement in Afganistan: Stepping Stone or Stumbling Block to Regional Hegemony?", 2009, GIGA Research Programme: Institute of Asian Studies, No. 98

Huang, Haizhou and Malhotra, Priyanka, "Exchange Rate Regimes and Economic Growth:Evidence from Developing Asian and Advanced European Economies", 2004, Research Department, International Monetary Fund

Hui, Daniel, "China, the Choice of Exchange Rate Regime, and Capital Account Convertibility", 2003, A policy paper, China's International Economic Relations and Domestic Reforms

Institute for Policy Research and Development ,"Implementation of Full Convertibility of Nepalese Rupee in Capital Account", March 2000, Economic Review (Occasional Paper, Number 12), Nepal Rastra Bank.

Institute for Sustainable Development ,"Capital Account Convertibility in Nepal: A feasibility Study", April 1994, Economic Review (Occasional Paper, Number 7), Nepal Rastra Bank.

Ito, Takatoshi, "Asian Currency Crisis and the International Monetary Fund, 10 Years Later: Overview", 2007, Asian Economic Policy Review (2007), University of Tokyo.

Jhingan, M.L, "International Economics", 2006, Fifth Edition, Vrinda Publications (P) Ltd, India

Karki, Dipendra, " Opening up of FSS Challenges for Nepalese banks", 2010, The Himalayan Times Online.

Kono, Masamichi and Schuknecht, Ludger, "Financial Services Trade, Capital Flows, and Financial Stability", 1999, World Trade Organization, Geneva.

Kothari, C. R., "Research Methodology, Methods and Techniques", 2004, Second edition, New Age International (P) Ltd., Publishers, New Delhi, India

Laurenceson, James and Kam Ki Tang, "China's Capital Account convertibility and Financial Stability", East Asia Economic Research Group Discussion Paper No. 5, October 2005, School of Economics, The University of Queensland, Queensland

"Macroeconomic Indicators of Nepal", various periodicals published by Nepal Rastra Bank, Research Department.

Maddala, G.S, "Introduction to Econometrics", 2008, Third Edition, Wiley India Edition.

Malakar, Radheshyam, " Possible Impacts on Nepalses Financial Service Sector under WTO Provision", (Unit 8)

Maskay, Nephil Matangi, "Distinction between Financial Service Sector Liberalization and Liberalization of the Capital Account", BS 2059, Nepal Rastra Bank Samachar.

Maskey, Nephil Matangi, "Economic Factors Influencing the Probability of Adjustment in Nepal's Exchange Rate Policy with the Indian Currency: A Binomial Probit Analysis for the Period 1976-1998", April 2001, Economic Review (Occasional Paper, Number 13), Nepal Rastra Bank

Maskey, Nephil Matangi, "The Impact of the Indian Monetary Policy and the Official Exchange Rate on Nepalese Monetary Policy", March 1998, Economic Review (Occasional Paper, Number 10), Nepal Rastra Bank

"Milestone", 2005, An International Souvenir Published on the Occasion of Golden Jubilee Celebration of Nepal Rastra Bank, Kathmandu, Nepal.

Nair, Lekshmi R., "Degree of Capital Account Openness and Macroeconomic Volatility in India- An Empirical Analysis", October 2006, Institute for Financial Management and Research Centre for Advanced Financial Studies, Working Paper Series.

"National Accounts of Nepal", various publications by Central Bureau of Statistics, Government of Nepal, National Planning Commission Secretariat

Pandey, Ravindra Prasad, Januray 1997, "An Application of Cointegration and Error Correction Modelling: Towards Demand for Money in Nepal", Economic Review, NRB, Number 9

Pant, Bhubanesh, " Capital Account Convertibility: Benefits, Costs and Challenges", n.d.

Paudel, Ramu, "Capital Account Convertibility", 2008, Nepal Rastra Bank Samachar, 53rd Anniversary Special.

People's Daily Online, "Indian Hegemony Continues to Harm Relations with Neighbors", October 14, 2009 (http://english.peopledaily.com.cn/90001/90780/91343/6783357.html)

Prabheesh. K. P, Malathy. D and Madhumati. R, "Demand for Foreign Exchange Reserves for India: A Cointegration Approach", 2007, South Asian Journal of Management Vol.14, No.2, 36-46.

Pyakuryal, Bishwambher, "The Capital Account Convertibility (CAC) in India: Impact on Nepal", 2007, SAIM Lecture Series (First Draft), South Asia Institute of Management, Jawalakhel, Lalitpur, Nepal.

"Quartely Economic Bulletin", various periodicals published by Nepal Rastra Bank

Rodrik, Dani, "Who need Capital Account Convertibility?" 1998, Essays in International Finance, No. 7, May1998

Romero, Ana Mari'a, "Romero '05, Ana Maria, "Comparative Study: Factors that Affect Foreign Currency Reserves in China and India" (2005). *Honors Projects.* Paper 33. http://digitalcommons.iwu.edu/econ_honproj/33

Schneider, Benu, "Issues in Capital Account Convertibility in Developing Countries", 2000, Overseas Development Institute, London.

Sehgal, Sanjay and Sharma, Chandan, "A Study of Adequacy, Cost and Determinants of International Reserves in India", 2008, International Research Journal of Finance and Economics (ISSN 1450-2887 Issue 20 (2008))

"Statistical Year Book of Nepal", various publications by Central Bureau of Statistics, Government of Nepal, National Planning Commission Secretariat

Subramanian, Arvind, "Capital Account convertibility: A Neglected Consideration", 2007, Paper presented at the Centre for Policy Research, New Delhi, India.

Tang, Tuck Cheong and Fausten K., Dietrich, "Current and Capital Account Interdependence: An Empirical Test", 2008, Monash University, Autralia, Business and Economics Discussion Paper 04/08.

Tarapore Committee, "Report of Committee on Fuller Capital Account Convertibility", July 2006, India

Tarapore, S.S, "An Indian Approach to Capital Account Convertibility", 1998, Essays in International Finance, No. 7, May1998

Thapa, Nara Bahadur, " An Econometric Analysis of the Impact of Real Effective Exchange Rate on Economic Activities in Nepal", 2008, Economic Review (Occasional Paper, Number 14), Nepal Rastra Bank