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OPENNESS AND GROWTH OF THE INDIAN ECONOMY: AN EMPIRICAL ANALYSIS

This study is based on the award winning entry for EXIM Bank International Economic Development Research Annual (IEDRA) Award 2010 for the doctoral dissertation titled "Openness and Growth of the Indian Economy: An Empirical Analysis", submitted to the Indian Institute of Technology Bombay, Mumbai by Dr. Narayan Chandra Pradhan, Research Officer, Reserve Bank of India, Mumbai. The dissertation was written under the supervision of Prof. Pushpa Trivedi, and was sponsored by the Reserve Bank of India. The views expressed here are those of the author and do not necessarily reflect those of the Export-Import Bank of India.

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EXECUTIVE SUMMARY

The study focuses on 'openness' which is expected to have a positive impact on the growth of Indian economy. Each chapter deals with a theoretical perspective on openness and growth. Although, the background of the study includes the post-independence period so as to highlight the lessons learnt from the import substituting industrialization, the analytical content focuses on the liberalization period beginning the 1980s, reinforced during 1990s and carried forward during 2000s. The temporal coverage of the empirical analysis carried out spans the period 1970-71 to 2008-09. The research question addressed in the study is: "whether openness has impacted India's growth rate, and if so, then in what direction?"

An overview of literature on the nexus between openness and growth reveals many aspects. The theories of trade discussed are those based on certain assumptions and tried to explain: (i) how and why different countries may gain from trade; and (ii) pattern of trade specialisation, i.e., why certain countries export particular goods and import others. The theory written over a hundred years ago still resonates and affects analysis and policy even in the present day context.

The role of multilateral international institutions, such as, WTO, IMF, World Bank and ILO in promoting trade openness and growth has been discussed in depth. The WTO focuses on rules for multilateral trade liberalization and transparency; the IMF on overall macroeconomic policy framework and balance of payments disequilibria; and the World Bank on long-term growth, development and sectoral trade issues. The ILO's role has been to ensure that the human face of labourer is not lost in implementing the competitive agenda of trade openness and growth.

In recognition of the growing importance of external openness in Indian economy, the focus is assigned on changing trade policy regimes of India; trade performance in the global context during the liberalization period; changing trade pattern – both composition and direction since 1980-81 in order to compare pre- and post-liberalization performance. Services exports have opened up new opportunities for India since the liberalization process started and

seen a structural shift starting from 2003-04 driven by the emergence of new avenues – exports of software services and business services that augur well for the services led growth.

This study puts forward the impact of labour mobility since 1980s. There are two major impacts of international labour migration from India, on the balance of payments: (i) through remittances from migrant labour; and (ii) through repatriated deposits held with the Indian Banks. In recent years, the world has witnessed migration of labour as a major feature despite the restrictive immigration laws, owing to the differences in demographic pressure and income levels among countries. At the same time, spread of education and communication are also facilitating the progress of labour openness from developing countries to developed ones.

Empirical testing of export-led growth hypothesis by applying various time series techniques reveals both short- and long-run relationship between export and output growth. Application of stationarity/unit root tests, viz., ADF, PP and KPSS, confirms that all the variables are non-stationary at log levels and there is existence of unit root in the series used. Subsequent residual based cointegration test on log levels between exports and GDP confirms their long run relationship. The coefficient of error correction term decides how quickly the equilibrium is restored. About 17 per cent of disequilibrium is corrected every year in the case of relationship between exports of goods and GDP; and about 14 per cent disequilibrium is corrected every year in the case of relationship between 'goods and services' and GDP. The significance of the error correction term at 5% level suggests a robust relationship between export growth and growth of real GDP. This reinforces the nexus between export and GDP growth in both short and long run. The test of Granger causality suggests that the direction of causality from export growth to GDP growth; since the estimated F-statistics is significant, at the 5% level up to 4 lags, at the 10% level at lag 5. On the other hand, there is no 'reverse causation' from GDP growth to export growth. The test of Granger causality/Block Exogeneity in VAR framework indicates lead-lag relationship between exports and GDP. The empirical evidence indicates that the movements in the exports of goods and services appear to lead the movement of GDP in Indian economy. This also indicates that one can use exports to better predict the GDP than simply by the past history of GDP.

The Cointegration tests demonstrate a long run relationship between net capital flows and non agricultural GDP. The Granger causality results,

however, do not point out to the validation of temporal causation between net capital inflows and growth. Hence, based on these tests, neither can we make any claims about the predictability of growth from capital inflows nor can we infer whether capital inflows have been due to pull factor.

Given the recent success of software exports from India along with the focus area approach to merchandise exports including its diversification, the finding is plausible and consistent with prior expectation that growth of exports – both merchandise and services – stimulates economic growth.

1 INTRODUCTION

Since 1980s, interdependence among nation-states has increased significantly in respect of trade to Gross Domestic Product (GDP) ratios. Now, it is an established fact that the growth of world merchandise trade has surpassed the growth of world GDP leading to even doubling of the trade-to-GDP ratios for some emerging economies between 1980 and 2008. This has emanated mostly from the increasing openness of the world's trade and financial markets and ongoing labour migration. These phenomena, in turn, have been stimulated by policy efforts, both at bilateral and multilateral levels through liberalising the rules governing trade and investment and by market forces that prompt MNCs to seek out better factor costs and conditions to site their locations outside the state of their origin.

With technological change in the information sector, huge capital flows occur almost instantaneously. The visible impact of integration has been seen in the European Union's (EU) market that is still expanding. Increasing capital mobility has also acted in a negative manner and endangered the ability of countries to insulate themselves from the external shocks.

In the above background of world economy, the structure of Indian economy has undergone a considerable change since mid-1991. These changes include, increasing importance of international trade and capital flows. The services sector has become a major driver of the economy with GDP share of more than 50 per cent and the country becoming an important hub for export of Information and Technology enabled services (ITES). The share of merchandise trade to GDP in India increased from 7.2 per cent in 1980-81 to 13.3 per cent in 1990-91 and further to 38.9 per cent in 2008-09. India has been perceived as an attractive destination for capital inflows and net capital inflows, due to various socio-political and economic considerations. Net capital inflows that were 1.9 per cent of GDP in 2000-01 increased to 9.2 per cent in 2007-08. Foreign portfolio investment added buoyancy to the Indian capital markets. Indian corporates began aggressive acquisition spree

overseas, which got reflected in the high volume of outbound direct investment flows during 2007-2009.

However, the year 2008-09 was marked by adverse developments in the external sector of the Indian economy, particularly during the second half of the year, reflecting the impact of global financial crisis. The *subprime crisis* of 2008 affected financial institutions in the United States (US) and the European Union (EU) countries, including the shadow banking system comprising of, *inter alia*, investment banks, hedge funds, private equity and structured investment vehicles. The collapse of US investment firm *Lehman Brothers* in mid-September 2008 had further aggravated the situation leading to a crisis of confidence in the financial markets. The resulting heightened uncertainty cascaded into a full-blown financial crisis of global dimensions. This fact has demonstrated that openness and its impact on the world economy can be a boon as well as a bane.

In the era of globalization, India could not insulate itself from the adverse developments in the international financial markets, despite having a banking and financial system that had little to do with investments in structured financial instruments carved out of subprime mortgages, whose failure had set off the chain of events culminating in global financial crisis. Emerging economies were affected in varying degrees depending upon the extent of openness and the dependence on capital flows as the external environment deteriorated on account of slowdown in global demand, reversal of capital flows and reduced access to external sources of finance in the face of adverse global credit market conditions. The episodes of global crises also meant that the economy experienced extreme volatility in terms of fluctuations in stock market prices, exchange rates and inflation levels during a short duration necessitating reversal of policy to deal with emerging situations. These facts are stark reminder of the negative side of openness/globalization that is making countries vulnerable to crisis like situation.

1.1 Concept of Openness

The openness of an economy is a continuous process which has evolved over time and the result of creative innovation and technological progress. It refers to the increasing integration of economies around the world, particularly through trade and financial flows. The trade channel is considered as one of the traditional modes of the integration of global economy. The mobility of capital has provided a new dimension to the concept of openness and economic integration that dominate over conventional trade channel.

There are broader political, cultural, and environmental dimensions of openness that has not been covered in this study.

In economic literature, the term 'openness' has become common usage since the 1980s, reflecting the technological advances that have made it easier and quicker to complete international transactions, both trade and financial flows. Markets promote efficiency through competition and the division of labour - specialization allows economies of scale. Global markets offer greater opportunity for people to tap into more and larger markets around the world. It indicates that, they can have an access to more capital flows, technology, cheaper imports, and larger export markets. However, markets do not necessarily ensure that the benefits of increased efficiency are shared either equally or proportionately by all.

Sometimes, openness is also equated with the process of 'globalization'. Some view it as a process that is beneficial - a key feature of world economic development - and also inevitable and irreversible, whereas others regard it with hostility, even fear, believing that it increases inequality within and between nations, threatens employment and living standards in poorer regions and thwarts social progress. Countries that have been able to integrate are witnessing robust growth and reduced poverty. An outward-oriented policy has brought dynamism and greater prosperity to many Southeast Asian economies, transforming from one of the poorest regions of the world 50 years ago. As living standards rose, it became possible to make progress on democracy and economic issues such as the environment and work standards.

Improvements in living standards can take place through the accumulation of physical capital (investment) and human capital (labour), and also through use of an advanced technology (i.e., total factor productivity). Many factors can help or hinder these processes. The experience of the countries that have increased output most rapidly shows the importance of creating conditions that are conducive to long-run growth in per capita income. Economic stability, institution building, and structural reforms are also important for long-term development as much as financial transfers. What matters is the whole package of policies, financial and technical assistance, and debt relief, if necessary (World Bank, 2009). The components of such a package might include: (i) Macroeconomic stability to create the right conditions for investment and saving; (ii) Outward-oriented policies to promote efficiency through increased trade and investment; (iii) Structural reform to encourage domestic competition; (iv) Strong institutions and an

effective government to foster good governance; (v) Education, training and research and development to promote productivity; and (vi) External debt management to ensure adequate resources for sustainable development.

1.2 Openness and Growth in the World Economy

The world economy has witnessed an age of unprecedented globalization since the 1980s. International trade and services along with capital flows have been liberalized and allowed to grow in many developing countries. There is substantial evidence from countries of different sizes and different regions that have benefited from the global process of openness in the form of access to wider variety of goods and services, lower prices, more and better paying jobs, improved health and higher overall living standards.

Global markets offer greater opportunity for people to tap into more diversified and larger markets around the world. They can have access to more capital, technology, cheaper import, and larger export markets. More importantly, the information and knowledge get dispersed and shared frequently by developing countries. Stiglitz (2002), despite being a frequent critic of globalization, has observed that *"Globalization has reduced the sense of isolation felt in much of the developing world and has given many people in the developing world access to knowledge well beyond the reach of even the wealthiest in any country a century ago*". Perhaps more importantly, globalization implies that information and knowledge get dispersed and shared.

In late 1980s, many developing countries, including India, started dismantling their barriers to international trade, as a result of poor economic performance under protectionist policies and various economic crises. In the 1990s, many former Eastern bloc countries integrated into the global trading system and developing Asia - one of the most closed regions to trade earlier - progressively dismantled barriers to trade. Overall, while the average tariff rate applied by developing countries is higher than that applied by advanced countries, it has declined significantly over the years, especially, in the aftermath of the formation of World Trade Organization (WTO) in January 1995.

The world financial markets have experienced a dramatic increase in openness in recent years. Global capital flows fluctuated between 2 and 6 per cent of world GDP during the period 1980–1995 and since then it is rising. In 2008 they aggregated to US$ 7.9 trillion, more than trebling since 1995 (World Bank, 2009). Though the most rapid increase

has been experienced by advanced economies, emerging markets and developing countries have also become more financially integrated. As countries have strengthened their capital markets, they have attracted more investment capital, which can enable a broader entrepreneurial class to develop, facilitate a more efficient allocation of capital, encourage international risk sharing, and foster economic growth. Yet, there is a debate underway, among leading academics and policy experts, on the precise impact of financial openness. Some see it as a catalyst for economic growth and stability. Others viewed it as injecting dangerous and often costly volatility into the economies of growing middle-income countries.

The analysis of the past 30 years of data by IMF's Research Department reveals two main lessons for countries to consider. First, the evidence points to gains from financial integration for advanced economies. However, in the emerging and developing countries, the effects of financial globalization can positively or negatively affect growth and also lead to volatility in economic activity. Second, there are also costs associated with being overly cautious about opening to capital flows. These costs include lower international trade, higher investment costs for firms, poorer economic incentives, and additional administrative / monitoring costs. Opening up of foreign investment may encourage changes in the domestic economy that eliminate these distortions and help foster growth.

Stiglitz (2002) has summarized a near circle process of globalization in world economy as follows: About a century ago, the global economy operated in a very open environment. Openness began to wither away with the onset of World War I (1914), and still recovering. Along the process, governments recognized the importance of international cooperation and coordination, which led to the emergence of numerous international organizations and financial institutions. Indeed, the lessons included avoiding fragmentation and the breakdown of cooperation among nations. The world is still made up of nation states and a global marketplace.

1.3 Motivation, Objectives and Methodology

The nature of relationship between openness and economic growth (in terms of national output or GDP) has been one of the most debated topics in recent past. It is not yet clear, whether the trade reforms necessarily led to higher economic growth. A few oft quoted studies have concluded that countries with a more

open trade orientation have tended to grow faster through time (Krueger, 1997; Michaely *et al*. 1991) than closed economies. This view has been contested by Rodriguez and Rodrik (2001), who have argued that "there is little systematic evidence linking inward orientation and growth, and that the evidence linking outward orientation and growth has overstated the relationship between the two".

The important question in this regard is: whether growth is 'export-led' or exports are 'growth-driven'? These questions are important, because the determination of causal patterns between export and growth have important implications for policymakers' for appropriate growth and development strategies. The existence of high correlation between exports and real GDP has been well documented in the literature. However, empirical studies have also produced mixed and conflicting results on the nature and direction of the causal relationship between exports and output growth.

Following the path of other developing countries, the Indian economy has embraced gradual trade liberalization since the 1980s, and almost compelled to reinforce the same in a big way in 1991. Since then the process of trade liberalization has continued unabated. The developments trends were characterized by a sustained momentum in domestic real activity, corporate sector restructuring, a positive investment climate, a long term view of India as an investment destination and favourable credit conditions in the global market. However, the absorption of capital flows has remained low with a moderate level of the current account deficit in the 1990s and 2000s and the consequent build-up of foreign exchange reserves, until the advent of the recent financial crisis. The large capital inflows have implications for the real sector of the economy through interest and exchange rate channels. The excessive capital inflows beyond the absorptive capacity, in conjunction with workers' remittances and software exports have the potential for overheating the economy, creating an over-valued exchange rate and the consequent erosion of long-term competitiveness of the traditional goods and services sectors – the Dutch disease phenomenon.

To address some of the above issues, this study adopts an eclectic approach drawing inference from the theoretical and empirical literature as well as economic history of multilateral institutions. It has been assessed whether the openness with external sector policy reforms have had any role to play in India's recent economic growth. The assessments of impact of openness is not only confined to merchandise trade, but also to trade in services, labour migration and its financial impacts, as well as

impact of capital flows on growth. The role of international institutions in promoting openness and in fostering process of growth in world economy has also been discussed. To our knowledge, this study is the first one that incorporates the whole gamut of openness having impact on growth of Indian economy. Over and above all, this study hopes to fill in certain gaps in existing literature on openness and growth nexus in Indian economy by applying both analytical approach and empirical techniques.

In brief, the major objectives of this study are:

- To examine the changing dimensions of India's trade and its impact on the growth of Indian economy;
- To examine the role of services exports on the growth of Indian economy;
- To assess the role of international institutions in the openness and growth process;
- To examine whether labour migration and subsequent remittances have any impact on financial flows of the Indian economy;
- To investigate empirically the validity of export led growth (ELG) and/or growth led exports (GLE) for the Indian economy; and
- To examine the nexus between capital flows and growth of Indian economy.

The methodology used in this study includes: Unit Root Tests, Cointegration technique, Error Correction Model, Vector Error Correction Model (VECM) in vector autoregression (VAR), bivariate Granger causality, and Block Exogeneity/Granger Causality in VAR framework.

1.4 Organization of the Study

Besides this introductory Chapter 1, the study is organized into remaining eight chapters. Chapter 2 takes stock of the available literature on openness and growth with emphasis on theories of international trade starting from the *Mercantilism* (prevailed between 16th and 18th centuries) to New Trade theories of the 1980s and 1990s. Chapter 3 examines the role of four major international institutions - the WTO, IMF, World Bank and ILO - in fostering openness and growth after the World War II and touch upon the recent financial crisis with evolving institutions in world economy. Chapter 4 analytically discusses India's trade openness and growth aspects since 1950s. The composition and direction of India's trade *vis-a-vis* other emerging market economies are point of focus since 1980-81 through 2008-09. Chapter 5 discusses openness in services trade of India since 1980s

and especially after the formation of the WTO in 1995 and its impact on the growth dynamics of Indian economy. *Chapter 6* devoted to the discussion of labour migration and financial inflows to Indian economy in terms of remittances and repatriable deposits since 1980. In *Chapter 7,* we have empirically tested the nexus between exports and economic growth since 1970-71 to verify the relevance of export-led growth hypothesis for India. *Chapter 8* is devoted to the analysis of capital account liberalization in India and management of capital flows since 1990-91. Furthermore, we have empirically tested the nexus between net capital flows and economic growth in terms of non-agricultural GDP for the period 1970-71 to 2008-09. Finally, Chapter 9 provides conclusions of the study.

2 TRADE OPENNESS AND GROWTH: A BRIEF SURVEY OF LITERATURE

There are many reasons for the countries to engage in international trade. One of the important reasons being a country can get goods from abroad that are cheaper as well as of higher quality than the home-made goods. It has been documented that, all countries in the world engaged in international trade mainly for two reasons, each of which contributes to their gains from trade. First, nations like individuals can benefit from their differences by reaching an arrangement in which each produce the goods relatively better way. This relativity in production and exchange arises from differences in costs, geographical distance, state-of-the-art technology used, and political compulsion in the form of economic integration. Second, countries trade to achieve economies of scale in production and distribution in the form of exports with the expanded markets. However, in the real world, pattern of international trade reflects the interaction of both the above motives (Krugman and Obstfeld, 2006).

To explain the reasons for countries engaged in international trade, many theories and insights have been propagated by economists over centuries. These theories revolve around the old ideas that are still relevant - the nineteenth century trade theory by David Ricardo remains highly relevant to the twenty-first century world economy. These theories are based on certain assumptions and tried to explain: (i) how and why different countries may gain from trade; and (ii) pattern of trade specialization, i.e., why certain countries export particular goods and import others. The theory written over a hundred years ago still resonates and affects analysis and policy even in the present day.

Earlier theories of international trade were particularly well provided with surveys and it would be pointless to try to cover all those. A special mention may be made to the surveys by Haberler (1936), Viner (1937), Caves (1960), Mundell (1960), Bhagwati (1963), and Kemp (1964) as well as the encyclopaedic history by Schumpeter (1954). The literature survey in this study is broadly divided into four parts, corresponding to the Classical, Neo-classical, Modern and New Trade theories.

The classical approach to trade theories generally revolved around the writings of Smith (1776), Ricardo (1817), and Mill (1917) based on the oversimplifying assumptions on production side has the advantage of bringing out sharply the nature of the problem of international specialization (Chipman, 1965a). The neo-classical approach rests partly on simplifications on both the production and consumption side as represented by the concepts of opportunity cost and community indifference curve surveyed by Lerner (1953), Haberler (1955), Meade (1955), and Chipman (1965b). The modern approach that began with Heckscher (1919) and Ohlin (1933) attach important role to factor endowments represents the most impressive theoretical structure has been surveyed by Chipman (1966). The new trade theories of recent origin follows a sequel to the earlier one covered by Bhagwati (1987). The main concepts that emerged from the analysis of trade theory in its various incarnations are that of comparative advantage and gains from trade.

A review of trade theory and policy, and growth literature reveals many aspects of the trade openness and growth process. Those important aspects can be summarized as follows:

Trade theories from the Mercantilism to New Trade models of recent origin focuses on (i) export as a leading sector; (ii) export as a balancing sector; and, (iii) export-linked import liberalization - in both developed and developing countries. In simplest form, various theories explain how the differences between countries give rise to trade and gains from trade. In a nutshell, a country's production pattern is determined essentially by comparative advantage.

The trade benefits a country can be shown in either of the two ways: (i) Trade as an indirect method of production requiring less labour than direct production; and (ii) Trade enlarges a country's consumption possibilities implying gains from trade. The distribution of the gains from trade depends on the relative prices of goods countries produce. International trade allows creation of an integrated market that is larger than any one country's market, and thus makes it possible simultaneously to offer consumers a greater variety of products at lower prices.

Trade need not necessarily be the result of comparative advantage. Instead, it can result from increasing returns or economies of scale, that is, from a tendency of unit costs to be lower with larger output. Economies of scale give countries an incentive to specialize and trade even in the absence of differences between countries in their resources or

technology (endowments). Trade in the presence of economies of scale must be analyzed using models of imperfect competition. Two important models of this kind are: (i) the monopolistic competition model, and (ii) the dumping model. A third model, that of external economies of scale is consistent with perfect competition.

In monopolistic competition model, trade may be divided into two kinds: (i) inter-industry, and (ii) intra-industry. Whereas, inter-industry trade reflects comparative advantage, intra-industry trade reflects economies of scale. Intra-industry trade does not generate the same strong effects on income distribution as inter-industry trade.

Trade policy in less developing economies can be analyzed using the same analytical tools used to discuss advanced countries. In particular, a trade policy in developing countries is concerned with two objectives: (i) promoting industrialization, and (ii) coping with uneven development of the domestic economy. Using the infant-industry argument as justification, many less developed countries have pursued policies of import substituting industrialization in which domestic industries are created under the protection of tariffs or import quotas. Although, these policies have succeeded in promoting manufacturing, by and large, they have not delivered the expected gains in economic growth and living standards.

The high performance of East Asian economies was realized by way of exports of manufactured goods. They are characterized both by very high ratios of trade to national income and extremely high growth rates. Economists have suggested that the roots of success may lie largely in domestic causes, especially high saving rates and improvements in education.

For several reasons, the traditional conclusion has been that the gains from trade do not result in merely once-over change in resource allocation, but are continually emerging with the gains from development: international trade transforms existing production functions and increases the productivity of the economy over time. If trade increases the capacity for development, with the larger volume of trade, the greater should be the potential for development. The positive view of trade and development thus emphasizes the direct gain that comes from international specialization plus the additional support to country's development through a number of spread effects within the domestic economy.

New growth theory has provided important insights for understanding

the relationship between trade and growth in a dynamic set up. If growth is driven by R&D activities, then trade provides access for a country to the advances of technological knowledge of its trading partners. Further, trade allows producers to access bigger markets and encourages the development of R&D through increasing returns to innovation. Especially, trade provides developing countries with access to investment and intermediate goods that are vital to their development processes. Finally, if the engine of growth is the introduction of new products, then trade plays an important role in growth by providing access to new products and inputs. Therefore, we may well argue that developing countries can receive more benefit from trade with developed countries, which are technologically innovative countries, than from trade with developing countries, which are non-innovating.

3 OPENNESS AND GROWTH: THE ROLE OF INTERNATIONAL INSTITUTIONS

More than 60 years have passed since the formation of Bretton Woods institutions – the International Monetary Fund (IMF), World Bank and GATT/WTO[1]. Over this period, the world economy has changed considerably not only in the realm of economics but also in the sphere of public policy. On economic front, the most noteworthy development during the period is economic integration, both at regional and multilateral levels, through more cross border flows - trade, services, labour, investment, and finance. The technological revolutions in transport and communications have virtually reduced the geographical barriers and facilitated the process of openness in developing countries. However, the cross-border movement of labour is closely regulated and highly guarded even now in developed countries.

The fall of 'Berlin wall' in 1989 and disintegration of the Soviet Union in 1991 gave way to the United States and its allies to determine the future shape of the global economic order. Market capitalism took on a truly global character as barriers to the movement of goods and capital has reduced to a large extent (Bhagwati, 2004; Wolf, 2004). Specifically, the majority of changes in world economic and political system took place in the late eighties and early nineties and carried forward in the twenty-first century.

At the same time, increasing economic prominence of China and India is reshaping the international financial system. Their exports and imports of merchandise and services have grown substantially in recent years. The economic performance, combined with the openness of their economies, makes China and India crucial players in the world economy. Over 1980-2008, the merchandise trade-GDP ratio for China increased from 12.3 per cent to 58.2 per cent, while the ratio for India grew from 13.3 per cent to 38.8 per cent (calendar year basis). By 2008, China accounted for 6.3 per cent of global trade, while India taking up a 1.3 per

[1]The General Agreement on Tariffs and Trade (GATT) was formed in 1947 and after the Uruguay Round of negotiations (1986-1994), the World Trade Organization (WTO) formed in January 1, 1995 with a broader mandate keeping most of its earlier provisions but adding rules that govern an expanded set of global

cent share. China and India have also become increasingly prominent in the international financial system in recent years. Both countries have gradually adopted policies that are more market-oriented and open to the flow of capital across their borders. Although their financial systems still remain restricted, China and India have received significant capital inflows in recent years (Lane and Schmukler, 2007).

With regard to the above changing scenario, international institutions have played major role in shaping world economic order and help reviving the openness of emerging economies. It has been stated that, the signatories to various trade agreements typically confer some authority to the GATT/WTO on the belief that a neutral or internationalized body is more effective in governing trading relations than an individual nation. Economists focusing on the purpose of various trade agreements identify a range of functions for an independent institution administering trade affairs, such as, a repository of knowledge, an archivist, a provider of research and trade assistance, an information gatherer and disseminator, a negotiation forum, a mediator, a facilitator, a monitor, a surveillance agent and an adjudicator. Multilateral institutions can also foster peaceful relations among countries, thereby creating the general conditions for profitable exchange through trade.

Stone (2006) have mentioned that, while the IMF lost its initial mission without fully securing a new role, the World Bank has probably adjusted better to the changing global economic environment by securing a more *knowledge-driven* role for itself. The WTO emerged out of the General Agreement on Tariffs and Trade (GATT) negotiations with a mandate to extend and embed the global marketplace, not least, through the integration of developing countries (Narlikar, 2005). However, the International Labour Organization (ILO) failed to respond to the challenges of labour market flexibility in the 1980s and structural adjustment in the 1980s and 1990s. It has failed to provide a coherent response to the insecurities and inequalities thrown up by the ongoing globalization. The ILO was set up as a means of legitimizing labour relations based on the standard employment relationship as an ingredient of international trade. That seems to be a distant dream in near future (Griffin, 2003).

Economic growth in the West also helped in the emergence of new powerful economies in the South as well as East. Notably, the rapidly developing state-controlled capitalism of the Peoples' Republic of China fed the West with consumer goods while lifting 400 million population out of poverty (Breslin, 2007). India, although it has not accepted the disciplines of open market as willingly

as China, has become a provider of technology-based and business services (Panagariya, 2008). Even though with lesser global impact, Brazil has consolidated its position as a powerful agricultural and commodity trader in the world economy (Higgott and Roadnight, 2008). However, these developments in the world economy have not been without problems. Arguably, these have replicated some of the boom and bust features of the old capitalist systems, at times on a larger scale.

The first post-Cold War[2] shock to the world economic system came in the form of *Asian Financial Crisis* of 1997-98, when the economies of Southeast Asia failed to cope up, *inter alia*, with the demands of rapidly liberalizing capital market, the impact of new technology and inadequate institutional structures to ensure the proper management of those markets. The crisis exposed the gap between market perceptions of the strength of the *national economies* and the reality that they were less robust *political economies* than viewed by the analysts (Dieter and Higgott, 2009).

During the last 20 years, the breakdown of the planned economies in the Soviet Union and Central and Eastern Europe, the economic reforms in China and India, and the export-driven growth strategies of Southeast Asian economies, all contributed to growth in world market economy. This shift has offered enormous opportunities and challenges for both developed and developing countries. Here, international financial institutions have played major role in formulating trade policy, exchange rate policy, financing for development and dispute settlement in the way of maintaining world peace. As we have offered a concentrated discussion on Bretton Woods institutions and ILO as a trend setter in growth of world economy, financial crisis also wreak havoc in the system. This calls for the evolution of some institution in the world financial architecture. In the following discussion, we have highlighted some of the findings from the analysis of international institutions.

The WTO promotes trade by serving as a forum for its member countries to negotiate trade agreements, which forms the legal ground-rules for international trade. The distinction between the roles of the IMF and WTO is clearer than the IMF-World Bank division, though it is by no means perfect. Legally, the WTO has jurisdiction over trade restrictions whilst the IMF has jurisdiction over exchange measures. WTO commitments and rules are limitations on the maximum amount

[2]The cold war comes to an end with the dismantling of Soviet Union and other East European economies in the beginning of 1990s.

of trade protection and the use of other protective policies. The WTO periodically reviews its members' trade policies. The IMF can cover trade policies in its surveillance and conditionality, although, unlike WTO commitments, IMF trade policy advice is not legally binding. Moreover, IMF policy advice and program design are guided by economic considerations. This may result in the IMF pressing for trade and trade-related reforms to proceed faster and deeper than WTO commitments.

Despite the diversity of interests among the contracting parties to the GATT, it has achieved considerable success in reducing tariffs in industrialized countries. Progress in dealing with quantitative trade restrictions was much slower than that of tariffs. A majority of source of grievance within GATT was the relatively poor export performance of many primary-producing countries. Whereas some of the reasons for this state of affairs were to be found in the domestic policies of the primary producing countries themselves, many of them believed that the industrial nations had used the exceptions in the GATT to protect their own relatively inefficient agricultural industries to the detriment of foreign primary producers.

The WTO was given a broader range of activities including agriculture, textiles and clothing trade, and trade in services. The trade related aspects of investment and the protection of property rights and some internal policy issues, such as, trade and the environment, competition policy, and labour standards which may feature as protection issues were also covered by the WTO. For the settlements of disputes the WTO was offered greater power. In addition to the setting up of the WTO, tariffs on industrial products were reduced from an average of 4.7 per cent to 3 per cent.

One of the main purposes of the IMF is to promote exchange stability, to maintain orderly exchange arrangements among members, and to avoid competitive exchange depreciation. This responsibility implicitly reflects the view that exchange rate policy has profound implications for the expansion and balanced growth of international trade. But in contrast to exchange rate arrangements and the system of exchange rates, international trade is not under the regulatory jurisdiction of the IMF.

The World Bank provides trade support through its lending operations, analytical work (research as well as economic and sector work carried out in its operational regions), advocacy, and capacity building activities. There is, in practice, no clear dividing line

between the work of the IMF and the World Bank with regard to trade policy. Thus, coverage of specific trade policy issues may appear in the analytical work of both institutions (surveillance in the IMF and World Bank) and may be the subject of conditionality for lending programs in either institution.

The current financial crisis appears to have a far-reaching impact on the world economy. Though started in the USA, out of a further bout of *irrational exuberance* the crisis has destabilized the global economy and has brought home the consequence of the under-regulation of the financial sector (Shiller, 2008). The collapse in the market for 'sub-prime' mortgages exposed the fragility of confidence in the system as banks stopped lending to each other. Financial institutions rushed to the regulators demanding protection from the consequences of their own follies.

At the outset, it appears that the ILO was also mooted as a development agency for 'colonies' and 'primitive' economies that adopt the standards, policies and institutions set in the 'advanced' countries. Recently, world leaders embraced the G-20 as the premier forum for international economic cooperation among the advanced industrialized countries and rising powers. This is a good start. But the G-20 cannot be a stand-alone committee. Nor can it ignore the voices of the over 160 countries left outside. The G-20 should operate as a 'steering group' across a network of countries and international institutions with a broader membership. It should recognise the interconnections among issues and foster points of mutual interest.

4 INDIA'S TRADE OPENNESS, TRADE POLICY AND GROWTH

At the time of independence in 1947, foreign trade of India was typical of that of a colonial and agricultural economy. Trade relations were mainly confined to Britain and other commonwealth countries. Exports consisted chiefly of raw materials and plantation crops, while imports were composed of light consumer goods and other manufactures. Over the last sixty years, India's foreign trade has undergone a major change in terms of growth, composition and direction. The exports cover a wide range of traditional and non-traditional items, while imports consist mainly of capital goods, petroleum products, raw materials, and chemicals to meet the ever-increasing needs of a developing and diversifying economy.

For about fourty years (1950-90), foreign trade of India suffered from strict bureaucratic and discretionary controls. Foreign exchange transactions were tightly controlled by the Reserve Bank of India (RBI) on behalf of the Government of India. During the period, India, with some exceptions, always faced deficit in its trade balance. This was a typical characteristic of a developing country struggling for reconstruction and modernization of its economy. Exports remained relatively sluggish owing to lack of exportable surplus, competition in the international market, inflation at home, and increasingly protectionist policies of the developing countries. Imports increased mainly due to increasing requirements of capital goods, defence equipment, petroleum products, and raw materials.

From mid-1991, the Government of India introduced a series of reforms to liberalize and globalize the Indian economy, i.e., adapting to the path of openness. Reforms in the external sector were intended to integrate the Indian economy with rest of the world. Reforms of trade and exchange rate policy was a critical element in the process of structural reform. Since the initiation of economic reforms, India's outward orientation has increased considerably. The major trade policy changes in the post-1991 period included simplification of procedures, removal of quantitative restrictions, and substantial reduction in the tariff rates. However, India's approach to openness has been cautious, contingent on achieving certain pre-conditions to ensure an orderly process of liberalization and

ensuring macroeconomic stability. This approach has been vindicated in recent years with growing incidence of financial crises in the world economy. Over and above all, the policy regime in India with regard to liberalization of the external sector has witnessed perceptible change.

4.1 World Trade Scenario

The post-War period of international trade in world economy can be divided into two broad phases: (i) 1950-80, and (ii) 1980-2009. The first phase witnessed a revival of world trade, especially among the industrialized countries. This was facilitated by the economic reconstruction and reduction in transport costs. International institutions established after the World War II have promoted the growth in trade: the IMF, World Bank, United Nations and GATT (now, WTO), were all established in the post-war years to promote free trade and economic development. Another important factor contributing to trade expansion was the multilateral initiative under the GATT that enabled dismantling of tariff and non-tariff barriers among the industrialized countries imposed during the inter-war period. The move towards currency convertibility on current account transactions by leading industrial powers which began in the late-1950s further facilitated growth in international trade. An important feature of world trade during this period was that, in almost every year, the increase in its volume exceeded the increase in the volume of world production. This also applied within the broad categories of products. In other words, it indicates trade-led economic growth in world economy (Kenwood and Lougheed, 1999).

The second phase of trade integration started during the late 1970s when a number of East Asian economies embarked on the path of export-led growth. This was reinforced further during the 1980s and the 1990s and carried forward in 2000s, wherein a large number of developing countries gradually increased their degree of openness. During this period, outward oriented policies were undertaken on the grounds of efficient resource allocation, infusion of modern technologies, promotion of economies of scale, retention of consumer surplus, and reduction of rent-seeking and unproductive profit-seeking activities (World Bank, 1993). For Latin America, the necessity to regain access to the international capital markets to refinance outstanding debt was an important consideration in their opening up during the 1970s.

Increasing trade openness by developed countries and later by developing economies resulted in significant changes in the pattern of world trade. The major structural changes witnessed can be summarized as follows: (i) Noticeable

increase in Asia's share in world trade mainly due to high export growth of China and East Asia since 1980s; (ii) Transformation of export basket of developing economies from primary commodities to manufacturing exports; (iii) Faster growth in exports of technology-intensive products by developing economies compared to industrialized ones; and (iv) Growth in South-South trade.

In contrast to earlier periods, global economic integration in the 1990s has been much more widespread and was primarily driven by liberalization of trade and capital controls. The technological revolution witnessed in recent years and the emergence of the new economy has further aided this integration process. As the process of opening up of economies unfolded during the 1990s, world trade witnessed its strongest revival since the 1960s in terms of volume growth. Although the real growth performance of Western Europe, Japan, the transitional economies of Central Europe and Africa was rather lacklustre during most of the 1990s, the strong revival in the volume of trade was mainly led by the US with support from developing countries including China, East Asia (especially prior to the 1997 crisis) and some Latin American countries.

Although, almost all of the East Asian countries posted double-digit trade growth during the 1990s (up to 1997), trade expansion in these countries suffered a major setback following the crisis of 1997. Their performance took a severe downturn in the years immediately after the crisis. The impact of the East Asian crisis on growth in volume of exports was less pronounced than for imports. China's trade performance (both exports and imports) continued to remain impressive throughout the 1990s. India too posted a healthy growth during the 1990s, especially during the initial years of economic reforms. Amongst the Latin American economies, Mexico witnessed significant growth in trade during the 1990s. The East Asian countries, especially, Malaysia, Korea and Philippines have also rebounded strongly since 2000.

Along with growth in overall volume, the pattern of world trade also underwent changes following structural shifts in production caused by new technologies, demand pattern, ways of organizing and locating production (business process outsourcing), and new international trade rules under the WTO. Primary products and resource-based manufactures have been gradually losing importance with world trade witnessing a shift towards non-resource-based products of increasing technology intensity. In keeping with this trend, there has also been a rapid change in the composition of developing country exports, from being primary commodity exporters to exporters of

manufactures. Manufacturing exports now account for the bulk of developing countries exports, with their share being more than 80 per cent for South Asia, East Asia and the Pacific. It is pertinent to note that developing countries are growing faster than industrial countries in exports of more technology intensive products.

Contrary to the initiatives taken by the East Asian economies during most of this phase, India could not take full advantage of greater openness in

Table 4.1: Trends in Trade Openness of Major Trading Economies

(Per cent)

Country	Avg 1980-84	Avg 1985-89	Avg 1990-94	Avg 1995-99	Avg 2000-04	2005	2006	2007	2008
Argentina	11.6	12.8	12.2	17.9	28.5	38.0	38.0	38.6	39.2
Brazil	24.9	13.4	12.8	13.8	21.5	22.2	21.4	21.5	24.2
Chile	35.2	47.0	45.7	46.0	54.0	62.6	66.2	70.1	75.7
China	14.8	24.6	34.2	34.3	46.5	63.6	66.3	64.3	58.2
France	37.2	35.3	34.6	38.6	43.3	43.3	45.2	45.2	45.7
Germany	48.8	48.8	41.3	43.5	56.0	62.9	70.1	71.7	72.6
Hong Kong	153.1	191.6	226.2	229.8	267.2	331.2	343.0	344.0	348.5
India	**12.2**	**11.1**	**15.0**	**18.8**	**22.2**	**30.9**	**33.8**	**32.7**	**38.8**
Indonesia	35.9	31.5	38.2	51.3	53.8	56.8	50.0	49.0	54.2
Japan	24.6	17.4	15.3	16.6	19.7	24.3	28.2	30.1	31.5
Korea	60.1	57.5	46.3	53.3	59.7	64.6	66.7	69.4	90.5
Malaysia	90.9	99.5	140.7	168.5	177.6	185.0	185.9	172.9	168.3
Mexico	22.1	29.9	30.3	52.5	50.9	52.5	54.5	55.5	56.7
Philippines	38.9	38.2	50.8	76.7	96.3	87.9	86.3	75.0	64.8
Russia	--	--	61.6	48.8	52.5	50.0	49.0	46.4	47.3
Singapore	321.3	296.3	285.5	273.4	293.5	355.3	366.8	336.9	361.6
South Africa	48.4	45.0	35.1	40.9	47.8	46.9	53.1	55.8	55.4
Thailand	44.8	51.0	67.7	80.3	109.7	129.5	125.4	119.4	128.7
Turkey	16.6	20.2	18.9	27.1	37.0	39.4	42.5	42.7	45.8
United Kingdom	41.5	41.3	39.0	42.3	38.5	37.5	40.0	37.7	40.9
United States	15.2	14.5	16.0	18.7	19.3	21.2	22.4	23.0	24.3

Note: Trade Openness is measured by the ratio of exports plus imports to GDP.

Source: Author's calculation, based on the following data sources.

(1) World Economic Outlook Database, April 2009, International Monetary Fund: For GDP. (2) International Financial Statistics, International Monetary Fund: For Exports and Imports.

Avg = Average

trade regime. Despite some export promotion measures undertaken in the 1970s, Indian industries continued to remain protected. While the signs of liberalized trade policy were clearly discernible in the latter half of 1980s, it was only in the 1990s that the country embarked on a truly liberalized trade regime. Trade openness, conventionally measured as the sum of exports and imports of goods as a ratio of GDP, brings out clearly the growing trade liberalization over time. For most of emerging economies (including India), their openness during 2000s is almost double or even higher than that during the 1980s **(Table 4.1)**. This has been facilitated, *inter alia*, by significant reduction in import tariffs.

From Table 4.1, it can be inferred that Hong Kong, Singapore and Malaysia have amount of trade exceed their GDP. These countries are basically shipping and processing centers, so they are importing goods, processing them, and then exporting the final product to other countries. At the bottom of the list are US and Japan, which are very large in economic size – large countries tend to have a lot of trade between states or provinces within their borders, but that is not counted as part of international trade. Conversely, smaller countries with close neighbours, such as, Hong Kong, Malaysia, and the smaller European nations have more trade spilling over across their borders and higher ratio of trade to GDP.

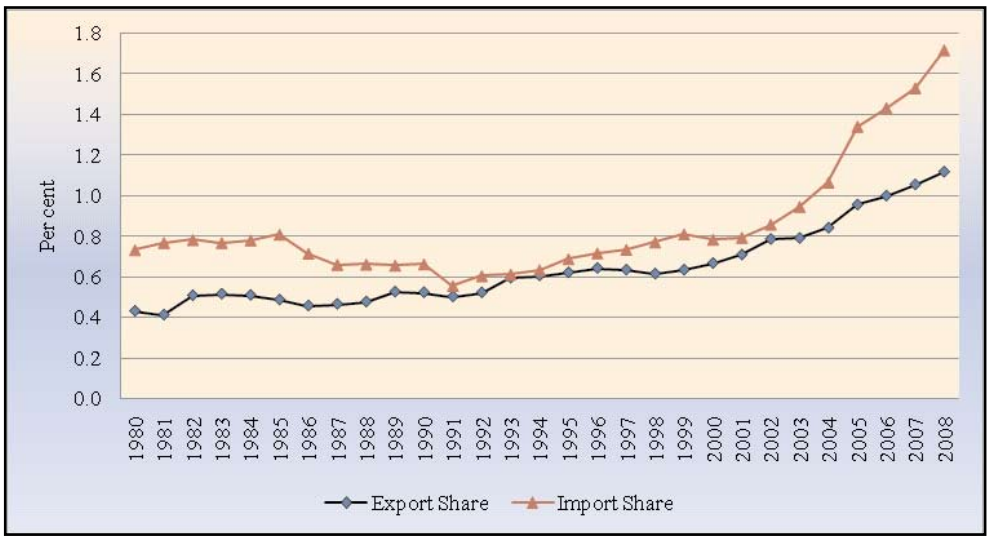
In a nutshell, the US, East Asian countries and China played a crucial role in expanding world trade in the 1980s. Buoyancy in world trade in the 1990s was sustained despite the lacklustre economic performance of several industrialized countries especially those in Europe and Japan. Although, the Asian crisis did cause a major disruption in international trade, the crisis affected countries have rebounded in recent years with growing trade volumes. Moreover, trade among developing countries has increased significantly in recent years. Though recent financial crisis inflicted some injuries during 2008-09 on world trade, there is strong expectation of recovery in 2010.

4.2 Trends in India's Foreign Trade

4.2.1 Share in World Trade

In 1950, India accounted for about 1.8 per cent (1.85 per cent of exports and 1.71 per cent of imports) of world trade. After gradually declining to 0.5 per cent in 1991, it marginally improved to 0.6 per cent in 1994. Subsequently, the decline in India's share in world trade has not only been arrested but reversed. From **Chart 4.1**, it is discernible that India's share in world exports as well as imports are on the rising trend. The Foreign Trade Policy (FTP), 2004-09 had set an ambitious task of achieving

Chart 4.1: India's Share of Global Merchandise Exports and Imports



Source: Directorate General of Commercial Intelligence and Statistics, Kolkata.

1.5 per cent share in the world trade by the year 2009. Recently announced FTP 2009-14 also set the long-term policy objective to double India's share in global trade by 2020.

4.2.2 Foreign Trade Performance

Though gradual trade liberalization began in 1980s, a broad-based liberalized trade regime was put in place during 1990s, which marked a significant turnaround from the earlier controlled regime. The challenge of restoring the macroeconomic balance initially was combined with a long-term new trade policy, which formed a major ingredient of the economic reforms program. It was recognized that trade policies, exchange rate policies and industrial policies should form part of an integrated policy framework, if the aim was to improve the overall productivity and efficiency of the economic system, in general, and the external sector, in particular. Apart from the devaluation of the exchange rate and a move over to a unified market determined exchange rate system in 1993, the new trade policy was characterized by a short negative list of exports and imports, lowering of the level and dispersion of nominal tariffs, withdrawal of quantitative restrictions on imports and phasing out of the system of import licensing. The trade policy reforms also encompassed significant changes in the system of export incentives, moving away from direct subsidies to indirect export promotional measures. The multi-pronged strategy undertaken in the beginning of the 1990s gradually had

Table 4.2: India's Trade Performance since 1980

Annual Average	Growth Rate (Per cent per annum)		As per cent of GDP		
	Exports*	Imports*	Exports#	Imports#	(Exports+ Imports)#
1980-81 to 1984-85	4.5	6.3	4.6	7.6	12.2
1985-86 to 1989-90	11.6	8.2	4.5	6.7	11.2
1990-91 to 1994-95	10.0	7.3	7.2	8.1	15.3
1995-96 to 1999-00	7.3	12.0	8.4	10.3	18.7
2000-01	21.0	1.7	9.7	11.0	20.7
2001-02	-1.6	1.7	9.2	10.8	19.9
2002-03	20.3	19.4	10.4	12.1	22.5
2003-04	21.1	27.3	10.6	13.0	23.7
2004-05	30.8	42.7	11.9	15.9	27.8
2005-06	23.4	33.8	12.7	18.4	31.1
2006-07	22.6	24.5	13.8	20.4	34.2
2007-08	29.0	35.5	13.9	21.4	35.3
2008-09	3.4	14.3	14.4	24.5	38.9

*: Data on exports and imports are taken in US$ terms.
#: Data on exports and imports are taken in Rupee terms.
Source: Author's calculation based on Handbook of Statistics on Indian Economy 2008-09, RBI.

its desired effects on the economy and ushered in a phase of stable and higher growth in trade **(Table 4.2)**.

The drastic reduction in growth rate of exports during 2001-02 was primarily due to structural constraints operating on the demand as well as on supply side. The recessionary tendencies across the world affected the demand for India's exports as well. Major supply constraints that continue to hamper India's exports include infrastructural constraints, high transaction costs, reservation for small scale industries, labour inflexibility, constraints in attracting FDI in exports sector and maintenance of product quality.

4.2.3 Composition of Exports

The changing structure of India's exports throws some interesting light on both the demand pattern and supply factors that are increasingly influencing India's exports and the manner in which its production structures, institutions and policies are responding to it. Regarding changes in the composition of exports since 1980s, it may be observed that the share of agriculture and

allied products has been declining, while that of ores and minerals has remained more or less steady. Share of manufactured goods has increased generally. Although the opening up of the Indian economy since the early 1990s provided an impetus for higher growth for most of the commodities, some products gained more than the others. Export products like iron and steel, petroleum products and pharmaceuticals gained both in terms of growth rate as well as share in the export basket. On the other hand, there were products such as cotton, leather, plantation crops and readymade garments that lost out in the export market in terms of export share **(Table 4.3)**.

India's merchandise exports are predominated by the manufacturing sector which accounted for more than three-fourth of its total exports during the 1990s and 2000s. There has, however, been considerable re-orientation of relative importance of products within the manufacturing sector. The main drivers within the manufactured product groups were chemicals and allied products, engineering goods, readymade garments, textile yarn, fabrics, made-ups, and 'gems and jewellery'. The

Table 4.3: India's Exports of Principal Commodities

(Share in per cent)

Commodity/Group	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2006-07	2007-08	2008-09
Plantation Crops	9.5	8.3	4.1	2.5	1.5	0.7	0.7	0.6	0.6
Agriculture & Allied	25.4	23.0	17.0	10.1	8.8	7.0	6.9	8.3	7.8
Marine Products	3.2	3.8	2.9	3.2	3.2	1.5	1.4	1.1	0.8
Ores & Minerals	4.7	5.5	3.3	3.7	2.6	6.0	5.5	5.6	4.3
Leather & Manufactures	5.0	5.9	5.0	5.5	4.4	2.6	2.4	2.2	2.0
Gems & Jewellery	9.0	8.0	16.1	16.6	16.8	15.1	12.6	12.1	15.2
Chemicals & Related	3.5	3.3	9.5	11.3	14.0	15.2	14.6	13.7	13.1
Engineering Goods	10.1	10.1	12.4	13.8	12.9	18.7	21.0	20.7	21.9
Electronic Goods	7.8	6.5	1.3	2.1	2.5	2.2	2.3	2.2	3.9
Textiles	13.5	14.4	20.9	25.3	24.3	15.1	13.0	11.3	10.5
Handicrafts	3.4	1.4	1.2	1.4	1.5	0.5	0.4	0.3	0.2
Cotton Raw incl. Waste	4.1	3.6	1.6	0.2	0.1	0.6	1.1	1.4	0.3
Petroleum Products	0.4	6.0	1.9	1.4	4.3	11.3	14.8	17.4	14.7
Unclassified Exports	0.8	0.2	1.7	1.1	1.7	2.4	2.4	2.5	4.2
Total Exports (US$ billion)	**8.5**	**8.9**	**18.2**	**31.8**	**44.6**	**103.1**	**126.4**	**163.1**	**182.6**

Note: Due to change in commodity classification since 1987-88, prior data are not strictly comparable.

Source: Directorate General of Commercial Intelligence and Statistics, Kolkata.

importance of primary products in the export basket has witnessed a steady decline over the years and especially since the 1990s whereas petroleum products exports have shown a dramatic rise since 2000-01.

4.2.4 Destination of Exports

Looking at the direction of India's exports, it is observed that the share of exports to the OECD countries has been declining, especially due to decline in India's share to the European Union and Japan. Share of exports to the USA has increased and so has to the OPEC and Latin American countries. It has gone down in the case of Eastern Europe, with slowing down of exports to Russia, while share of exports to less developed countries in Africa and Asia have remained more or less at the same level. Exports to other countries have increased **(Table 4.4)**.

4.2.5 Composition of Imports

The structure of India's imports has undergone change since the opening up of the Indian economy. In the post-liberalization phase, the tolerance level of imports has undergone a significant upward revision in the face of greater

Table 4.4: Direction of India's Exports

(Share in per cent)

Country / Region	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2006-07	2007-08	2008-09
I. OECD countries	58.9	55.9	56.5	55.7	52.7	44.5	41.2	38.8	38.2
A. EU	25.1	24.9	27.5	27.4	23.4	21.7	20.4	20.2	21.7
B. North America	19.7	17.1	15.6	18.3	22.4	17.8	15.8	13.8	12.5
U.S.A	18.6	16.2	14.7	17.4	20.9	16.8	14.9	13.0	11.7
C. Asia and Oceania	11.6	11.2	10.4	8.3	5.1	3.3	3.4	3.1	2.6
D. Other OECD	2.5	2.7	3.0	1.6	1.9	1.6	1.6	1.7	1.4
II. OPEC	6.1	6.7	5.6	9.7	10.9	14.8	16.4	16.5	18.9
III. Eastern Europe	16.5	19.3	17.9	4.2	3.0	1.9	2.0	2.1	1.1
IV. Developing countries	14.2	15.6	17.1	28.9	29.2	38.5	40.2	42.3	38.3
A. Asia	11.9	13.2	14.4	23.0	22.5	30.1	29.8	31.5	28.3
a) SAARC	2.6	2.5	2.9	5.4	4.3	5.4	5.1	5.7	4.9
b) Other Asian developing	9.3	10.7	11.4	17.6	18.2	24.7	24.6	25.8	23.4
B. Africa	2.0	2.0	2.2	4.8	4.4	5.5	7.0	7.6	6.6
C. Latin American countries	0.3	0.4	0.5	1.2	2.3	3.0	3.4	3.2	3.4
V. Others / unspecified	4.2	2.6	2.9	1.5	4.3	0.3	0.3	0.4	3.5
Total Exports (US$ billion)	**8.5**	**8.9**	**18.2**	**31.8**	**44.6**	**103.1**	**126.4**	**163.1**	**182.6**

Source: Directorate General of Commercial Intelligence and Statistics, Kolkata.

Table 4.5: India's Imports of Principal Commodities

(Share in per cent)

Commodity/Group	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2006-07	2007-08	2008-09
Petroleum, crude and products	42.2	26.5	25.0	20.5	31.0	29.5	30.8	33.2	32.9
Bulk consumption goods	7.5	12.1	2.3	2.6	2.9	1.9	2.3	1.9	1.6
Other bulk items	5.6	3.9	17.7	15.9	7.4	9.6	12.4	11.9	13.2
Capital goods	14.5	20.2	24.2	28.2	17.7	25.3	25.3	24.4	21.3
Mainly export related items	17.9	19.2	15.3	14.3	15.9	12.5	9.6	8.7	9.9
Others	12.3	18.0	15.4	18.5	25.2	21.3	19.6	20.0	21.0
Total Imports (US$ billion)	15.9	16.1	42.2	36.7	50.5	149.2	185.7	251.6	291.5

Note: Due to change in commodity classification since 1987-88, prior data are not strictly comparable.

Source: Directorate General of Commercial Intelligence and Statistics, Kolkata.

avenues for foreign exchange inflows, thereby unshackling the hitherto dormant economic growth potential. With the move away from import substitution and towards promotion of trade based on dynamic advantage, the policy distinction between essential imports and otherwise has gradually subsided. Commodity-wise analysis reveals that while petroleum still continues to have a dominant presence in India's imports, capital goods and other intermediary products for export purposes have emerged as key items of imports in the 1990s and 2000s **(Table 4.5)**.

There have been a number of subtle compositional shifts within the broad level of aggregation during the last decade. For instance, within the petroleum imports, there has been a shift from import of petroleum products towards crude imports following a large scale increase of refinery capacity over time. Furthermore, India has transformed itself from a net importer of finished petroleum products to net exporter of the same starting from 2001-02. Another significant development during the 1990s has been the channelizing of imports of gold through official routes. Since 1997, when banks were allowed to import gold, the import of gold through passenger baggage has declined significantly.

4.2.6 Sources of Imports

Subsequent to the opening up, India's imports are being sourced from a wider range of countries. Traditionally important trading

partners like Germany, Japan, UK and Australia have subsided in terms of their market share and new import partners from Africa and East Asia (including China) have emerged and are increasingly gaining importance. In recent years, Belgium, from where India imports its major export oriented item of gems and jewellery, has emerged as one of the principal sources of imports. Another interesting feature has been the gradual dissipation of the Commonwealth of Independent States (CIS) countries as major sources of India's imports. Furthermore, the OECD countries, and EU in particular, have been the major supplier of the import items. The share of imports from OPEC and Russia has declined while the share of imports from Africa, Asia and Latin America has remained more or less constant **(Table 4.6)**.

Table 4.6: Sources of India's Imports

(Share in per cent)

Country / Region	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2006-07	2007-08	2008-09
I. OECD countries	59.8	60.7	57.2	52.4	39.9	34.7	34.5	31.6	30.3
A. EU	33.3	31.9	29.4	28.1	20.8	16.9	15.3	13.8	13.0
France	3.6	2.9	3.0	2.3	1.3	2.8	2.3	1.2	1.0
Germany	9.7	8.7	8.0	8.6	3.5	4.0	4.1	4.0	3.5
U.K.	8.2	8.5	6.7	5.2	6.3	2.6	2.2	2.1	2.0
B. North America	10.3	13.0	13.4	11.6	6.8	7.0	7.3	6.3	6.5
U.S.A	9.0	11.5	12.1	10.5	6.0	6.3	6.3	5.5	5.8
C. Asia and Oceania	12.0	12.0	11.2	9.7	5.9	6.2	6.4	6.0	5.7
D. Other OECD countries	4.2	3.8	3.2	3.0	6.4	4.7	5.5	5.5	5.0
II. OPEC	13.3	13.4	16.3	20.8	5.3	7.5	30.2	31.8	32.2
III. Eastern Europe	9.6	6.9	7.8	4.6	1.7	2.5	2.7	2.2	2.3
IV. Developing countries	17.3	19.0	18.7	22.2	22.1	25.4	32.2	33.6	31.6
A. Asia	12.1	13.4	14.0	17.5	16.7	20.4	25.5	26.8	25.5
a) SAARC	0.4	0.5	0.5	0.7	0.9	0.9	0.8	0.9	0.6
b) Other Asian developing	11.7	12.8	13.5	16.8	15.8	19.5	24.7	25.9	24.9
China, People's Republic	0.7	0.5	0.1	2.2	3.0	7.3	9.4	11.3	10.3
B. Africa	2.9	3.5	2.4	3.1	3.9	3.2	3.7	4.3	4.2
C. Latin American countries	2.3	2.1	2.3	1.6	1.4	1.8	3.0	2.6	1.8
V. Others / unspecified	0.0	0.1	0.0	0.0	31.0	29.8	0.4	0.7	3.7
Total Imports (US$ billion)	15.9	16.1	42.2	36.7	50.5	149.2	185.7	251.7	291.5

Source: Directorate General of Commercial Intelligence and Statistics, Kolkata.

4.2.7 Import Intensity of Exports

In view of the changing contours of Indian trade over the years, especially since the 1990s, one pertinent question is the effect of imports on India's exports - more specifically how much of imports get translated into exports. Import intensity of exports can simply be defined as the degree of value addition of an imported item that subsequently gets exported. In the Indian context, gems and jewellery is a typical example of such export product having high import intensity. Another way of defining import intensity of exports is to identify those exports which are heavily dependent on imported inputs. These imported inputs may belong to the same sector or a different sector altogether. Imports may not only have a direct impact on exports through the import content but may also have an indirect effect in augmenting exports through other indirect spillover channels. Thus, a broader definition of import intensity of exports incorporates not only the direct quantum of imports that is channeled to exports but also the indirect effects of imported products that augment exports.

Based on the ITC (HS) commodity classification, a select set of items could be identified that are mainly imported for export purposes, such as 'gems and jewellery', 'chemicals and allied products' and 'textile yarn, fabrics, made-ups', etc. A comparison of corresponding finished products that are exported by value-adding these import items show a high import intensity in 'gems and jewellery' and 'chemicals and allied products'. The extent of such import intensity, however, appears to be declining for both the items since the early 1990s.

5 TRADE IN SERVICES AND GROWTH

The growing importance of services sector in national output has been accompanied by an expansion of commercial services in world exports. Between 1980 and 2008, world trade in commercial services increased at an annual average rate of 8.2 per cent. According to the World Trade Statistics 2009 of the WTO, the growth rate of commercial services has been rather high at 14 per cent between 2003 and 2008 touching the value of US$ 3.5 trillion mark in 2008. This reflects the fact that demand for services tends to be income-elastic: as people become wealthier, they spend relatively more on services, such as, tourism, health and education. Despite the increase in services exports, the share of services in world trade (one fourth) has been smaller than its share in world production (two-third) during 2008. The reason may be different characteristics of goods and services. Some of the services are more difficult to transport or transfer; i.e., they are less tradable and often must be consumed at the point of production. As a consequence, service enterprises are less export-oriented (*or open*) than the merchandise sector.

Attention towards trade in services came into focus during eighties in the wake of multilateral trade negotiations under the General Agreement on *Trade in Services* (GATS) that was concluded under Uruguay Rounds (UR). Services have also come into prominence in a number of regional trading agreements including the European Union (EU), North American Free Trade Area (NAFTA), and Southern Common Market (MERCOSUR[3]). The reason for this is the developments in information and communication technologies, and the greater market access resulting from the widespread deregulation of the public utilities.

The progress towards a multilateral system of trade in services - GATS under the aegis of the WTO is significantly influenced by country-specific assessments of the cost and

[3]MERCOSUR was created in 1991 by the Treaty of Asuncion and which consists of four Latin American countries: Argentina, Brazil, Paraguay and Uruguay. The European Union has favoured the strengthening of MERCOSUR and supported its initiatives, notably through the Inter-institutional Agreement to provide technical and institutional support for its newly created structures.

benefits of liberalization of domestic barriers to trade in services. In this context, Mattoo et al. (2006) have analyzed the *static* and *dynamic* effects of liberalizing services trade on economic growth. According to them, countries with fully open telecom and financial services sectors witnessed growth rates of about 1.5 percentage points higher than the other countries. The *static* effects of liberalization of trade in goods in the absence of services trade liberalization could well result in negative effective protection for goods, since many services are key inputs in production process. This highlights the need for liberalization of trade in services in tandem with that of goods. It has been argued that there are particularly large gains to be realized from eliminating barriers to trade in services like in transport which facilitate trade.

The *dynamic* effects of liberalizing trade in services are increasingly being assessed in the context of growth. Spillovers of technology or skills embodied in service flows increase productivity of national factors of production and hence help to increase GNP. On the other hand, although the scale of domestic activity (involving the sum of foreign and domestic factors) is likely to expand, employment of national factors of production need not. The impact on GNP growth will then comprise of a factor effect which could be negative, and a productivity-enhancing effect, which will be positive (Mattoo and Carzaniga, 2003).

It is interesting to note that not only there is more international trade now than in the past, but the fact that the categories of trade have also changed. The provision of service or the production of various parts of a good in different countries that are used or assembled into a final good in another location is called foreign outsourcing or more simply outsourcing. Slicing the value chain in this way is consistent with the idea of comparative advantage, since each country is engaged in those activities for which its labour is relatively cheaper. Outsourcing is a relatively new phenomenon in world trade. At times, outsourcing, however, is a trade in intermediate inputs, which can sometimes cross borders several times before being incorporated into a final good that can be sold domestically or abroad.

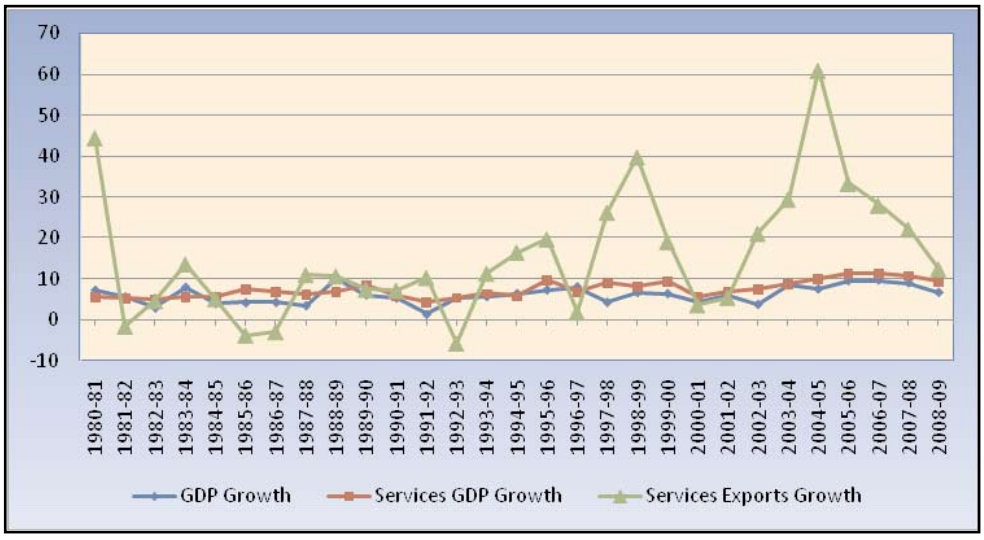
Openness and Services Trade in India

India's trade in services under balance of payments (BoP) comprises of non-factor services categorized under (i) travel, (ii) transportation, (iii) insurance, (iv) 'Government services not included elsewhere' (GNIE), and (v) miscellaneous services. Under miscellaneous services, four major categories are software services, business services, financial services,

and communication services. An important feature of services exports of India has been a structural shift since 2003-04, driven by the emergence of new avenues of services exports attributed to a rapid expansion in international trade and investment facilitated by an increased liberalization and the use of information technology enabled services (ITES). Services exports doubled from US$ 26.9 billion in 2003–04 to US$ 57.7 billion in 2005–06 and further to US$ 101.2 billion in 2008-09 **(Chart 5.1).** While no quantitative assessment has been attempted so far, it may be hypothesized that the high rate of growth in the services sector in recent years is due at least in part to the success achieved in telecommunications sector (Panagariya, 2008).

According to the Balance of Payments Statistics published by the IMF, India's share in world exports of services has doubled to 2.7 per cent between 2003 and 2008. Reflecting this positive development in terms of the comparative advantage and the continued buoyancy of India's services exports, India ranked at 9th position in terms of its market share in the world services exports during 2008 (WTO, 2009). Similarly, the services payments have increased on account of robust expansion in domestic economy, rising freight costs, growing outbound tourist traffic, payments related to business and management consultancy, architectural, engineering and other technical services. Trend in India's services trade *vis-à-vis* services GDP are provided in **Table 5.1**.

Chart 5.1: Growth Rate of Total GDP, Services GDP and Services Trade (Per cent)



Source: Author's calculation based on Handbook of Statistics on Indian Economy 2008-09, RBI

Table 5.1: Indicator of Services in Indian Economy

Year	Services Exports (US$ billion)	Share of Services Exports in Total Exports	Growth of Production of Services (%)	Services Exports Growth (%)	Services Imports (US$ billion)
1980-81	2.8	24.9	5.6	44.5	1.5
1981-82	2.8	24.1	5.2	-1.6	1.7
1982-83	2.9	23.3	4.9	4.6	1.9
1983-84	3.3	25.0	5.6	13.6	2.2
1984-85	3.5	25.5	5.7	5.1	2.4
1985-86	3.3	26.0	7.4	-3.8	2.1
1986-87	3.2	23.6	6.9	-3.0	2.2
1987-88	3.6	22.0	6.3	11.0	3.0
1988-89	4.0	21.7	6.8	10.7	3.2
1989-90	4.2	20.0	8.5	7.4	3.5
1990-91	4.6	19.8	5.9	7.2	3.6
1991-92	5.0	21.6	4.3	10.3	3.8
1992-93	4.7	20.0	5.4	-5.8	3.6
1993-94	5.3	18.8	6.4	11.3	4.7
1994-95	6.1	18.6	5.8	16.5	5.5
1995-96	7.3	18.5	9.6	19.7	7.5
1996-97	7.5	18.0	6.9	1.8	6.8
1997-98	9.4	20.9	9.0	26.2	8.1
1998-99	13.2	27.8	8.1	39.8	11.0
1999-00	15.7	29.5	9.3	19.1	11.7
2000-01	16.3	26.4	5.7	3.6	14.6
2001-02	17.1	27.7	6.9	5.4	13.8
2002-03	20.8	27.9	7.5	21.1	17.1
2003-04	26.9	28.8	8.8	29.4	16.7
2004-05	43.2	33.7	9.9	61.0	27.8
2005-06	57.7	35.4	11.2	33.3	34.5
2006-07	73.8	36.4	11.3	28.0	44.3
2007-08	90.1	35.2	10.8	22.1	52.5
2008-09	101.2	36.6	9.4	12.4	51.4

Source: Author's calculation based on data from the Handbook of Statistics on Indian Economy 2008-09, RBI.

Since 1991, India has carried out a substantial liberalization of trade in services along with freeing up of foreign investment. Traditionally, services sectors have been subject to heavy government intervention. Public sector presence has been conspicuous in the key sectors of insurance, banking, and telecommunications. Nevertheless, considerable progress has been made towards opening the door wider to private sector participation, including foreign investors.

Services have shown relative resilience *vis-à-vis* other components of India's balance of payments in the face of global economic slowdown, with net services surplus expanding from US$ 37.6 billion during 2007-08 to US$ 49.8 billion during 2008-09, led primarily by software services exports. India's services receipts are dominated by travel earnings, software and business services, reflecting a strong international tourist interest in India, rising importance of India's high skilled workers and comparative advantage in exports of information and technology enabled services **(Table 5.2)**.

Software Services

At the disaggregated level, the trade in services has been dominated mainly by software services and non-software miscellaneous services, which includes business and professional services. Traditionally, while services relating to goods trade, such as, transportation and financing of trade were the major constituents, the rapid

Table 5.2: Structure of India's Services Exports

Year	Total Services Exports (US$ billions)	Share in Total Services Exports (Per cent)					
		Travel	Transport-ation	Insu-rance	GNIE	Software	Miscella-neous*
1980-81	2.8	43.5	16.3	2.3	4.0	0.0	33.9
1985-86	3.3	29.3	14.9	1.9	2.9	0.0	51.0
1990-91	4.6	32.0	21.6	2.4	0.3	0.0	43.6
1995-96	7.3	36.9	27.4	2.4	0.2	0.0	33.1
2000-01	16.3	21.5	12.6	1.7	4.0	39.0	21.3
2005-06	57.7	13.6	11.0	1.8	0.5	40.9	32.1
2006-07	73.8	12.4	10.8	1.6	0.3	42.4	32.4
2007-08	90.1	12.6	11.1	1.8	0.4	44.7	29.4
2008-09	101.2	10.8	10.9	1.4	0.4	46.4	30.1

*: Excluding Software Services. GNIE: Government not included elsewhere.

Source: Author's calculation based on data from Handbook of Statistics on Indian Economy 2008-09, RBI.

developments in telecommunications and information technology has facilitated the emergence of business and computer services related to trade in investments as the main drivers. Thus, the focus of services trade has shifted from facilitating trade in goods to trade in services as an independent entity in itself with the four modes of supply for the delivery of services in cross-border trade.

Reflecting this, India has emerged as a major software exporting country with a level of US$ 47.0 billion in 2008-09, expanding at an average rate of around 34 per cent in the past eight years despite a global slowdown of IT sector **(Table 5.3)**. With the continued buoyancy in software exports, they constituted about 44 per cent of total services exports, on an average, during 2000-01 to 2008-09. Apart from software, business services have also grown significantly, reflecting the emergence of India as a preferred investment destination following a greater integration of the domestic economy with the rest of the world and strong macroeconomic fundamentals.

The Indian IT-BPO industry is a major contributor to the economy and has a multiplier effect in terms of export earnings, investment, employment and overall economic and social development. Notwithstanding increasing competitive pressures, India remains an attractive source due to its low cost of operations, high quality of product and services and readily available skilled manpower (RBI, 2009). Furthermore, a favourable time zone difference with North America and Europe helps Indian companies achieve round the clock international operations and customer service. According to National Association of Software and Service Companies (NASSCOM), while the US (61 per cent) and the UK (18 per cent) remained the largest market for IT-BPO export in 2008-09, the industry has also been steadily expanding to other regions - with exports to Continental Europe, in particular, growing at a compound annual rate of more than 57 per cent during 2003-04 to 2008-09. At present, the Indian IT industry has over 400 delivery centers across 52 countries. This strategy of geographical diversification along with a strong focus on productivity, benchmarking, and enhanced operational efficiencies will help the industry to take forward its competitive edge as the global leader in software services exports.

Furthermore, to withstand global competition, Indian companies have started moving up the value chain by exploring untapped potential in IT consulting and system integration, hardware support and installation and processing services. According to NASSCOM, the industry's vertical market exposure was well diversified across several mature and emerging

Table 5.3: Software Services Exports of India

(US$ billion)

Year	IT Services Exports	ITES-BPO Exports	Total Software Services Exports
1995-96	0.8	-	0.8
1999-00	3.4	0.5	3.9
2000-01	5.4	0.9	6.3
2001-02	6.1	1.5	7.6
2002-03	7.1	2.5	9.6
2003-04	9.2	3.6	12.8
2004-05	13.1	4.6	17.7
2005-06	17.3	6.3	23.6
2006-07	22.9	8.4	31.3
2007-08	29.4	10.9	40.3
2008-09	30.5	16.5	47.0

Note: ITES: Information and Technology enabled services; BPO: Business Process Outsourcing.

Source: National Association of Software and Service Companies (NASSCOM).

sectors. Banking, Financial Services and Insurance (BFSI) remained the largest vertical market for Indian IT-BPO exports, followed by high-technology and telecommunications, together accounting for nearly 60 per cent of the Indian IT-BPO exports in 2006-07. Security concerns have also been duly recognized to maintain customer confidence. From a customer's point of view, the focus has been on consolidation, integration and regulation – all of which are expected to drive newer business opportunities for the Indian IT industry.

Broad-based growth across all the segments of IT services, BPO, product development and engineering services has reinforced India's leadership as the key sourcing location for a wide range of technology related services. Accordingly, India continued to be ranked first in the exports of computer and information services in the international economy since 2005. As per the latest data of the WTO, India's share in world exports of computer and information services was around 17 per cent in 2006. According to the NASSCOM, software exports of India is expected to grow by 16-17 per cent, factoring in the impact of the global economic crisis during the second half of the year, to reach US$ 47 billion during 2008-09. Despite an uncertain economic environment,

according to the NASSCOM, the Indian IT-BPO industry is expected to experience sustainable growth over the next two years and India's software services exports is projected to reach US$ 60-62 billion by 2010-11. The market (total revenue potential) for global technology services exports, according to the NASSCOM, in core geographies (the US, Western Europe and Japan) will continue to grow and is likely to reach between US$ 500-550 billion by 2020.

Business and Professional Services

Business, professional and technical services are among the most thriving services sectors in developed countries as well as in some developing countries like Brazil and India. These services range from legal to management services and from architectural to advertising services. India's non-software miscellaneous services constituted almost 30 per cent of total services exports in 2008-09, which in turn, have supported steady growth in invisibles receipts. Within non-software miscellaneous services exports, the share of business and professional services have grown significantly in recent years. The business services payments have also increased sharply in recent years, reflecting the ongoing technological transformation of the economy and modernization of the Indian industry with a great deal of focus on technological up-gradation on a sustained basis. The major constituents of business services have been management consultancy, architectural engineering and other technical services, maintenance of offices abroad and trade-related services. Amongst business services payments, maintenance of offices abroad and advertising have decelerated, while there was a general increase in most other categories. With the rising demand for infrastructure and as a favourable destination for international companies for meeting the IT needs, India is emerging as an important country for trade in engineering services. Engineering services mainly includes consultancy in designing and detailed designing services.

Travel

Receipts under travel represent expenditure by foreign tourists towards hotel expenses and goods and services purchased including domestic travel. Travel receipts continued to benefit from the robust growth in tourist arrivals. Tourism earnings continued with their buoyancy witnessed since 2003-04, reflecting business, healthcare and leisure travel. Liberalization of the payments system, growing globalization, rising services exports and associated business

travel as well as the preference for higher studies abroad have led to sustained growth in outbound tourism from India since the 1990s. Concomitantly, travel payments also increased, reflecting rising business and leisure travel in consonance with (i) growing merchandise and services trade, and (ii) growing disposable incomes of residents in an environment of liberalized payments regime. The potential for greater leisure tourism and business travel indicate the continuation of a sustained growth in this segment in the near future. Travel receipts as a percentage of total services exports, after declining during 2004-05 to 2006-07, increased marginally to 12.6 per cent during 2007-08 from 12.4 per cent a year ago. The gradual hike in the amount residents are permitted to remit per financial year for any permitted current or capital account transaction under the liberalized remittance scheme operative since February 2004 (from US$ 25,000 per calendar year in February 2004 to US$ 2,00,000 effective September 26, 2007) along with the general appreciation of domestic currency against major foreign currencies during 2007-08 made outbound tourism attractive. This was reflected in the sharp increase in outward remittances under the category 'others', which includes education, tours and travels, from US$ 16.4 million in 2006-07 to US$ 160.4 million during 2007-08. Notwithstanding this, the surplus on travel account stood at US$ 2.1 billion during 2007-08 (US$ 2.4 billion in 2006-07).

India's position in the world's tourist earnings has improved significantly in recent years. Accordingly, India ranked 18th in the world tourist earnings in 2007 as against 23rd in 1990.

Transportation

In view of the rising merchandise trade over the years, the receipts and payments towards transportation, which mainly represents carriage of goods and people as well as other distributive services (such as port charges, bunker fuel, stevedoring, cabotage, warehousing), have also increased over the years. Receipts under transportation increased to US$ 10.0 billion during 2007-08 from US$ 8.0 billion in 2006-07, while payments were higher at US$ 11.5 billion as compared with US$ 8.1 billion during the same period. At this level, the transportation receipts constituted 11.1 per cent of total services exports during 2007-08 as compared with 10.8 per cent in the previous year. The sharp increase in fuel prices, higher freight charges as well as the inability of some major shipping routes to meet demand continued to have a significant effect on transportation costs.

Insurance

Insurance consists of insurance on exports/imports, premium on life and non-life policies and reinsurance premium from foreign insurance companies. Insurance receipts and payments are generally associated with the movement in India's merchandise trade. The share of insurance receipts in total services receipts remained around 2 per cent of total services exports since the early 1990s.

Other Components of Services

In addition to the software services, business services, travel, transportation and insurance, the other component under trade in services includes a host of other commercial services such as financial, communication, construction and personal, cultural and recreational services. However, financial and communication services are the two major components. Under financial services, both receipts and payments have witnessed a significant increase in recent years reflecting greater merger and acquisition activities by domestic companies abroad as well as increasing access by Indian corporate and banks to international financial markets. Financial services covers financial intermediation and auxiliary services provided by banks, stock exchanges, factoring enterprises, credit card enterprises and other enterprises. Both financial services exports and imports were around US$ 3.2 billion in 2007-08. India ranked at 8th position in terms of financial services exports and 7th position in terms of importer of financial services in 2006. Communication services exports have also increased significantly in recent years, reflecting technological transformation of the domestic economy as well as significant liberalization of the telecom sector. India ranked 4th position amongst the world's top 15 telecommunication exporters in 2007.

6 LABOUR MIGRATION AND FINANCIAL FLOWS

The principles of international factor movements do not differ in their essential characteristics from those underlying international trade in goods and services. Although, there is a fundamental similarity between the *trade* and *factor movements*, there are major differences in the political economy context. A labour-abundant economy may under some circumstances import capital-intensive goods; under other circumstances it may acquire capital by borrowing abroad. A capital-abundant country may import labour-intensive goods or begin employing migrant workers. A country that is too small to support firms of efficient size may import goods, where large firms have an advantage or allow those goods to be produced locally by subsidiaries of foreign firms (Krugman and Obstfeld, 2006). As a follow up of the earlier part of this study, the current chapter deals with the realms of labour migration as a form of factor movements that have an element of openness and have impact on growth in terms of financial flows.

In recent years, the world has witnessed migration of labour as a major feature despite the restrictive immigration laws, owing to the differences in demographic pressure and income levels among countries. At the same time, spread of education and communication are also facilitating the progress of labour openness or migration from developing countries to the developed ones. In some instances, migration may be regarded as being permanent, as in the case of immigration of Europeans to North America and Australia; and the more recent migration of peoples from the Caribbean, Africa and Asia to Europe and the United States. At the other extreme, some migration is basically temporary, as the case with Turkish guest-workers in Germany, Indian workers in Middle East, and Mexican agricultural workers in California (Borjas, 1999).

According to an estimate by the United Nations (UN), migrants account for about 3 per cent of the world's population (175 million approximately) in 2005. The stock of immigrants in high income countries increased at about 3 per cent per year from 1990 to 2005, up from the 2.4 per cent in the 1980s. The share of migrants in high-income countries' population almost doubled over the 25 year

period (1980-2005) and population growth (excluding migration) fell from 0.7 per cent per year in the 1980s to 0.5 per cent between 1990 and 2005. The migration had visible impact on population growth in several high-income countries (Hanson, 2008).

The motivation for such migration is necessarily complex, depending not only on differences in wage rates but also on differences in cost of living, the level of public benefits, such as, health care, education, etc., the perceived ease of economic integration, and so on (Ratha and Mohapatra, 2009). Though, international labour movements are influenced by forces of supply and demand, it is constrained by non-economic factors, such as, explicit immigration laws or implicit consular practices. Hence, the actual outcomes are not shaped by economic factors alone but also by non-economic factors (Nayyar, 1994). As international labour migration has grown, workers' remittances have increased steadily to developing countries since 1995 **(Table 6.1)**. The amounts of remittances that flow to developing countries have already surpassed that of official resource inflows. Since 1999, workers' remittances have been the second largest resource flowing into developing countries with that of foreign direct investment (FDI) being the first. The relative importance of official assistance has been diminishing and is no longer the most reliable source of capital for developing countries (World Bank, 2006).

As compared to other types of resource inflows, remittance flows possess several favourable features. One oft-noted characteristic is that, they are more stable than other private flows that fluctuate in response to business cycles. This is evident in the movement of capital flows before and after the Asian financial crisis and in times of financial turmoil during 2008-09. While other private flows went through an erratic boom-and-bust type cycle, remittances continued to remain steady. A part of this stability may have arisen from workers' concern about families back home and been driven by altruistic motives. Workers' remittances provide a kind of insurance or safety net for residents in developing countries (Chami *et al.* 2003). This is especially important for those bordering on subsistence living in developing countries **(Table 6.1)**.

Worker's remittances are linked to labour migration and in more recent times to the economy's ability to locate labour overseas as a trade strategy. The per capita income in source countries can, in fact, fall due to migration and the inward remittances resulting from migration can only partially compensate for the loss of human capital. A contrasting perspective is provided by the New Economics of Labour

Table 6.1: World Remittances

(US$ billion)

Items	1995	2000	2001	2002	2003	2004	2005	2006	2007
Inward Remittance flows	101.6	131.5	146.8	169.5	205.6	231.3	262.7	297.1	317.7
All developing countries	57.5	84.5	95.6	115.9	143.6	161.3	191.2	221.3	239.7
Outward Remittance flows	98.6	110.1	118.8	131.3	146.8	166.2	183.4	207.0	218.5
All developing countries	12.4	11.5	13.6	20.4	23.8	30.9	36.0	44.2	52.5

Note: This table reports officially recorded remittances. The true size of remittances including unrecorded flows through formal and informal channels is believed to be larger. Earlier data does not have bifurcations in terms of developing country group-wise.
Source: World Bank Immigration Statistics; accessed on December 5, 2009.

Migration (NELM), which considers migration as an integral part of the household's objective to enhance income levels, investment capacity and acquire insurance against risk (Stark and Bloom, 1985). In a cyclical perspective, remittance inflows can be negative during the initial period of migration of workers to defray the initial cost of migration to be borne by the source household. This phase is followed by increasing flow of remittances as the migrant workers start generating and remitting income to the home country. Subsequently, the decision of migrant worker to settle down in the destination country can reduce the flow of remittances.

Migration and Financial Flows in Indian Economy

Inflows from overseas Indians are mainly in the form of: (i) inward remittance towards family maintenance; and (ii) deposits in the Non-Resident Indian (NRI) deposits schemes with the banks in India. However, remittances from overseas Indian include the inflows towards family maintenance and the funds domestically withdrawn from the Non-Resident Indian (NRI) rupee deposits [NRE(R)A and NRO deposit schemes].

According to the IMF's Balance of Payments Manual, 5th Edition (1993), unrequited transfers represent one-sided transactions, i.e., transactions that do not have any *quid pro quo*, such as, grants, gifts, and migrants' transfers by way of remittances for family maintenance, repatriation of savings and transfer of financial and real resources linked to change in resident status of migrants. The private transfers include grants that constitute a very small proportion in India. The deposits under NRI

deposits schemes with the banks in India which can be repatriated is the second category of financial flows associated with international labour migration from India. Unlike remittance inflows that represent unrequited transfers in the current account, inflows which originate from Indian migrants overseas take the form of deposits that are repatriable; these are entered into the capital account on the balance of payments.

Remittances

The workers' remittances are linked to labour migration. These remittances are recognized as a relatively reliable source of external finance as compared with capital inflows. Among the components, local withdrawals from NRI deposits showed relative stability. This phenomenon is related to the overall policy approach of switching the composition of non-resident deposits in favour of rupee denominated schemes and realignment of maturity and interest rates. It needs to be emphasized that, workers' remittances have witnessed the lowest volatility among all components of current receipts, after merchandise exports, as well as in comparison with capital flows such as non-resident deposits and foreign investment **(Table 6.2)**.

In recent years, there is an upsurge in workers' remittances to developing countries. Remittances provide a safety net to migrant households in times of hardship and these flows typically do not suffer from the governance problems that may be

Table 6.2: Relative Volatility of Workers' Remittances (Coefficient of Variation)

	1980-81 to 1989-90		1991-92 to 1999-00		2000-01 to 2008-09	
Items	**Mean Value in US$ billion**	**CV**	**Mean Value in US$ billion**	**CV**	**Mean Value in US$ billion**	**CV**
Exports	11.0	24.88	29.0	25.76	96.8	52.09
Imports	18.4	17.34	39.4	32.42	142.0	63.05
Invisibles	2.9	43.73	6.7	61.88	39.9	69.18
Foreign Investment	0.2	58.76	3.8	58.29	20.9	85.49
Income	0.5	30.17	1.1	61.09	6.9	66.73
Remittances	2.5	7.33	8.5	41.30	26.1	45.62
NRI Deposits (net)	1.1	73.38	1.3	72.85	2.5	72.2

Note: CV: Coefficient of Variation = $\frac{\text{(Standard Deviation)}}{\text{Mean}} \times 100$

Source: Author's calculation based on data from HBSIE 2008-09, RBI.

associated with official aid flows. Given the uncertain outlook for global growth, commodity prices and exchange rates, the outlook for remittances remains uncertain during 2009. According to the World Bank (2008), although remittances are expected to fall in 2009, they are unlikely to fall as much as private flows and official aid to developing countries. Remittances are the largest source of external financing in many developing countries. Also, remittances have been less volatile than other sources of foreign exchange earnings in developing countries (World Bank, 2006). A cross-country comparison of the recent flow of remittances to developing countries reveals that at US$ 52.0 billion, India is the leading remittance receiving country in the world during 2008 with relative stability in such inflows **(Table 6.3)**.

The macroeconomic impact of remittance flows is more important in a situation where the departure of migrants does not reduce domestic output and remittances increase national income. The difference between increase in income and the increase in consumption attributable to remittances would be saved. The rate of saving may rise or fall depending on the propensities to save out of domestic income and foreign income. The use of savings would influence not only the level but also the mix of investment. The consequent increase in investment may lead to a further increase in output and income through the multiplier effect (IMF, 2007).

Table 6.3 : Workers' Remittances - Top Ten Receiving Countries #

(US$ billion)

Country	2001	2002	2003	2004	2005	2006	2007	2008α
India	14.8	16.3	21.9	20.0	23.9	29.3	38.2	52.0
Mexico	8.9	9.8	13.7	16.7	20.3	23.7	24.0	26.3
Nigeria	1.2	1.2	1.0	2.3	3.3	5.4	9.2	10.0
Philippines	6.3	7.2	7.7	8.6	10.7	12.5	13.3	18.6
China	0.9	1.7	3.3	4.6	5.5	6.8	10.7	15.1
Egypt	2.9	2.9	3.0	3.3	5.0	5.3	7.7	9.5
Spain	3.7	4.0	4.7	5.2	5.3	6.1	10.7	11.8
Romania	..	..	..	..	3.8	5.5	6.8	7.3
Morocco	3.2	2.9	3.6	4.2	4.6	5.5	6.7	7.2
Bangladesh	2.1	2.9	3.2	3.6	4.3	5.4	6.6	6.2

#: Ranking is based on the data for 2008; .. : represent negligible amount.

α: World Bank Estimates.

Source: Balance of Payments Statistics Yearbook (various issues), IMF

The demand for semi-skilled/unskilled labour from Middle East started in mid-1970s and peaked in the early 1980s, which was followed by the second wave during mid-1990s led by information technology boom. Thus, the migration pattern changed from unskilled/semi-skilled to highly skilled workers to the United States. The pattern of migration and their skill content has in fact determined the pattern of remittance inflows to India.

A significant share of remittances to India continues to be contributed by inflows from the oil exporting countries of Middle East. Thus, the behaviour of remittances to India is likely to be influenced by growth patterns in these countries, best represented in the form of oil prices. Another important source of remittance inflows to India is the US. In the Indian context, a major part of funds remitted by expatriate workers is channelized through inflows to non-resident deposits in the form of local withdrawals. Measures taken in the past to foster the use of formal channels for remitting workers' remittances to India include the adoption of a market determined exchange rate, current account convertibility and speedier process of remittance transfers through bank branches.

The share of remittances repatriated by the overseas Indians for family maintenance, which contributed a significant share of remittance flows to India stood at about 60 per cent in 1999-2000 declined to around 42 per cent in 2005-06. Subsequently, however, its share increased and reached 50 per cent during 2008-09.

Private Transfers

The oil shocks shifted substantial resources towards oil exporting countries, which engendered investment and employment opportunities in such countries. At the same time, a number of developing countries with migrants in oil exporting countries, attempted to mobilize the savings of their migrant workers by offering special non-resident deposit schemes with incentives, such as, higher interest rate, tax incentives and exchange guarantees. Such schemes have been successful in countries with large expatriate population, such as, Turkey, Israel, Egypt, Lebanon, Greece, Spain, India, Pakistan, Sri Lanka, Thailand and some East European countries. Most of these countries instituted deposit schemes denominated in both foreign currency as well as the local currency. In most cases, the principal of deposits along with the accrued interest were freely repatriable.

A major part of outflows from NRI deposits is in the form of local withdrawals, which are not actually repatriated out of the country but utilized domestically, making them

equivalent of unilateral transfers without any *quid pro quo*. Such local withdrawals/ redemptions from NRI deposits cease to exist as liability in the capital account of the balance of payments and assume the form of private transfers, which is included in the current account of the balance of payments.

In the Indian case, NRIs were allowed to open and maintain bank accounts - both the Rupee and the foreign currency denominated – in India under special deposit schemes in the mid-1970s. In the 1980s, investor preference clearly shifted in favour of foreign currency denominated deposits partly due to the interest rate differentials and also due to the exchange guarantees. The deposits of NRIs proved to be a stable source of support to India's BoP up to 1990. However, the external payments difficulties of 1990-91 demonstrated the vulnerability associated with such flows. Consequently, since the 1990s, the policy with respect to the NRI deposits has been to retain the attractiveness while at the same time reducing the effective cost of borrowings and aligning the overall interest rate structure. In the recent period, such deposits have declined in their significance as an important source of capital inflows.

Another key aspect of NRI deposits has been a structural shift from foreign currency to rupee denominated deposits. The share of rupee deposits in total outstanding NRI deposits increased from 28 per cent at end March 1991 to 68 per cent at end March 2009. This shift towards domestic currency deposits can be attributed to a number of factors such as the withdrawal of exchange guarantees on foreign currency deposits to banks, the relatively higher returns on rupee deposits and the growing home bias in NRI deposits.

Although the average contribution of local withdrawals to total private transfers declined from 50 per cent in the first half of the 1990s to only 29 per cent in the latter half, a reversal in this trend has been witnessed in the recent period. Since 2003-04, there has been relatively rising significance of the local withdrawal route as a conduit to remittance inflows to India. The share of local withdrawals in the total private transfers increased to 45 per cent during 2008-09. The rising trend in local withdrawals could be attributed to higher income levels of migrants in the recent past as well as better domestic investment opportunities on the back of robust growth and relatively benign inflation conditions. Even under the current global financial and economic crisis, the gross inflows to NRI deposits and the steady trend in local withdrawals indicate that remittance inflows may be sustainable over the medium term. It may be noted that a major part of outflows from NRI deposits

(constituting about 85 per cent, on an average) is in the form of local withdrawals from NRI deposits. However, during 2008-09, the share declined significantly to around 60 per cent reflecting higher outflows under the FCNR (B) accounts.

Under the liberalized policy for imports, the Government of India permitted import of gold by certain nominated agencies for sale to jewellery manufacturers, exporters, NRIs, holders of special import licenses and domestic users. Nominated agencies / banks were permitted to import gold under different arrangements such as suppliers/ buyers credit basis, consignment basis and outright purchase. Thus, after 1997-98 gold imports through passenger baggage by the returning Indians lost its importance as a conduit of remittance flows. In recent years, the inflows under this channel have also increased, albeit with some moderation in 2008-09. The money repatriated is predominantly donations to charitable/religious institutions/NGOs.

7 EXPORTS AND ECONOMIC GROWTH: AN ECONOMETRIC ANALYSIS

Economists across the board have agreed with the opinion that the process of economic growth is an extremely complex phenomenon. It depends on many variables, such as, capital accumulation (both physical and human), openness of trade and capital accounts, price stability, political situation, income distribution, and even on geographical factors. Export-led growth (ELG) hypothesis postulates that export expansion is one of the prime determinants of economic growth of an economy. Growth can be attained not only by increasing the amounts of labour and capital within the economy, as the classical economists postulate, but also through foreign trade multipliers. According to proponents of ELG hypothesis, exports can perform the function of an engine of growth. The association between exports and economic growth is often attributed to the positive externalities for the domestic economy arising from participation in world markets, for instance, from the reallocation of existing resources, economies of scale and various labour specialization effects (Bhagwati, 1978; Krueger, 1978).

The term ELG hypothesis is seldom explicitly defined in the economic literature. Most of the analysts invoke some notion of multiplier effect, whereby, an initial favourable change in the export sector sets in motion forces leading to expansion of output. Kindleberger (1962) defines trade as a leading sector, when “exports rise and contribute an incentive to the establishment and expansion of other activities”. Similarly, Meier (1976) explained that the export sector acts “as a key propulsive sector, propelling the rest of the economy forward”.

Since 1970s, a series of empirical studies have been conducted on nexus between exports and output growth. The key issues involved in earlier studies related to both the analytical and econometrics techniques used. In fact, the evidence available is inconclusive and this situation explains to some extent why this debate still persists in the economic literature. According to Feder (1982), earlier studies could have been misleading in the sense that they advocated export expansion in an indiscriminate way. Added to this debate is the issue of causality

between exports and growth. In other words, the debate hovers around whether growth is 'export-led' or exports are 'growth-driven'. This question is important, because the determination of the causal pattern between export and economic growth has important implications for policy-makers' decision about the appropriate growth and development strategies.

The lack of consistent causal pattern between exports and output growth in the earlier studies may be due to one or more of the following reasons. The models in those studies might not be properly specified because of: (i) the omission of an important variable, such as, capital and world output growth; (ii) the traditional Granger causality F-test in a regression context may not be valid if the variables in the system are integrated, since the test statistic does not have a standard distribution (Toda and Philips, 1993); and (iii) the temporal aggregation issues from use of annual time series may yield erroneous causation results (Bahmani-Oskooee and Alse, 1993). Taking account of this, we have included both the gross domestic capital formation and world GDP so as to incorporate effects of these variables on growth in our analysis. As regards to Granger causality test, we have strengthened our analysis by testing Granger causality in Johansen's VAR framework. In addition, we have used Error Correction Model (ECM) to correct for short-run fluctuation that may take place in the course of attainment of long-run equilibrium.

Exports and Growth Nexus

Objectives, Hypothesis and Methodology

Our basic objective is to examine the relationship between export growth and economic growth and test the ELG hypothesis in the context of Indian economy. At the same time, we have also examined whether the growth driven exports hypothesis finds empirical validity during the period of this study. The analysis has three distinctive features differentiated from earlier empirical studies: (i) It covers the period 1970-71 to 2008-09 and hence includes the most recent data (of annual frequency) and includes services exports besides the merchandise exports (on BoP basis); (ii) the analysis is carried out by focusing on India, instead of cross-country comparisons; (iii) the study has examined empirically both the short and long-run relationships between export growth and GDP growth by applying following methodologies:

(i) Stationarity Tests;
(ii) Cointegration Test;
(iii) Error Correction Models (ECM)
(iv) Johansen's Vector Error Correction Model (VECM) in VAR
(v) Granger causality test, and

(vi) Block Exogeneity/Granger Causality in VAR

The description of methodology is provided in Appendix.

Data Used in Empirical Analysis

Data used in empirical analysis has been obtained from 'Handbook of Statistics on the Indian Economy 2008-09' (HBSIE). The data for the current empirical analysis pertaining to the period 1970-71 to 2008-09 compiled basically from HBSIE, partly owing to ease of availability at our end, and partly for using exports of both goods and services. The time series data on 'GDP at factor cost at constant prices' and gross domestic capital formation (GDCF) are compiled from the 'Central Statistical Organization' of the Government of India (Base Year: 1999-2000), the same is also published in HBSIE for the period 1970-71 to 2008-09. The time series data on real effective exchange rate (REER) are calculated from the RBI's HBSIE based on splicing technique to fix to a particular base year. It may be mentioned that the data on REER up to 1992 are based on official exchange rates and data from 1993 onwards are based on Foreign Exchange Dealers' Association of India (FEDAI) indicative rates. REER indices are recalculated from April 1993 onwards using the new wholesale price index (Base: 1993-94=100). A new 6-currency REER series (Trade-based weights) has been introduced with effect from December 2005 (published in monthly RBI Bulletin), which we have incorporated in our analysis basically to track the competitiveness of India's exports. The world GDP data at constant US dollar terms are compiled from the online database of World Development Indicator of the World Bank.

The data set used for empirical investigation regarding the nexus between exports and growth is that of annual frequency and covers the period 1970-71 to 2008-09. All the series are subjected to logarithmic transformation. The data description and their specifications in empirical analysis are as follows:

- RGDP: GDP at factor cost in Rupees Crore; (at constant 1999-2000 prices).
- EXGD: Exports of Goods in US$ billion; BoP basis.
- EXGS: Exports of Goods and Services in US$ billion; BoP basis.
- GDCF: Gross Domestic Capital Formation in Rupees Crore; (at constant 1999-2000 prices)
- REER: Real Effective Exchange Rate index; 6-Currency trade-based weight (Base 1993-94=100)
- WGDP: World GDP at constant US$ billion.

All the above variables are subjected

to logarithmic transformations. The prefix 'L' stands for the natural logarithm of the respective time series variables, 'R' stands for the residuals of the respective regression, and 'D' denotes differencing of the relevant time series. It is important to mention that, all econometrics exercises have been carried out by using EVIWS 5.1 by QMS software.

Empirical Results on the Unit Root Tests

It may be mentioned at the outset that all data series have been converted into log form and **Table 7.1** summarizes the results for unit root tests on log levels and in first differences of logs of the respective variables (with maximum lag length of 3 as indicated in equation $\Delta Y_t=\alpha_0+\delta Y_{t-1}+u_t$. For the ADF tests, the lag length is based on the Akaike Information Criterion (AIC), while for the PP test bandwidth selection is based on Newey-West. It can be ascertained from the test statistics that all variables are found to be non-stationary at log levels **(Table 7.1)**. The hypotheses of presence of unit roots in the case of these series cannot be rejected. Under first differences the hypotheses of unit roots in the series examined are rejected, which means that the series under consideration are integrated at an order of 0, i.e. I(0), or stationary processes. It can be stated that, "if the first difference of a series is stationary or I(0) process, then the series in levels is an I(1) process".

In case of all the variables we have tested through ADF, PP, and KPSS **(Table 7.2)**, the same conclusion derived – variables in log levels are I(1) processes. The results of the unit root tests performed corroborate previous findings in the empirical literature, i.e., as with most macroeconomic series, the variables under consideration in this study appear to be non-stationary in log levels. It is only in their first differences in logs that these series exhibit stationarity.

Emprical Results of Cointegration Tests

The contribution of Engle and Granger (1987) was to demonstrate that although the individual series could be non-stationary, i.e. they are I(1), a linear combination of them might be stationary, i.e., I(0). Consequently, this section of the empirical study investigates whether the series under scrutiny are cointegrated, so that a well defined linear relationship exists among them in the long run. We have tested the relationship between exports (export of goods and 'export of goods and services') and Real GDP with following regression, the result of which is presented in **Screenshot 1**.

Regression Equation:

(i) $LRGDP=\alpha+\beta LEXGD+u_t$ (7.1)

(ii) $LRGDP=\alpha+\beta LEXGS+u_t$ (7.2)

Table 7.1: ADF and PP Unit Root Tests for the Data Series (1970-71 to 2008-09)

Series	Type	Test-Statistics	T-critical at 1%	T-critical at 5%	T-critical at 10%	Result	Conclusion
LRGDP	ADF	3.4403	-3.6210	-2.9434	-2.6103	Don't Reject Ho	LRGDP~I(1)
	PP	4.3534	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LRGDP~I(1)
D(LRGDP,1)	ADF	-5.8287***	-3.6210	-2.9434	-2.6103	Reject Ho	DLRGDP~I(0)
	PP	-5.8414***	-3.6210	-2.9434	-2.6103	Reject Ho	DLRGDP~I(0)
EXGD	ADF	-0.1610	-3.6210	-2.9434	-2.6103	Don't Reject Ho	LEXGD~I(1)
	PP	0.0549	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LEXGD~I(1)
D(LEXGD,1)	ADF	-3.8415***	-3.6210	-2.9434	-2.6103	Reject Ho	DLEXGD~I(0)
	PP	-3.8415***	-3.6210	-2.9434	-2.6103	Reject Ho	DLEXGD~I(0)
LEXGS	ADF	-0.0966	-3.6210	-2.9434	-2.6103	Don't Reject Ho	LEXGS~I(1)
	PP	0.2685	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LEXGS~I(1)
D(LEXGS,1)	ADF	-3.4024**	-3.6210	-2.9434	-2.6103	Reject Ho	DLEXGS~I(0)
	PP	-3.4100**	-3.6210	-2.9434	-2.6103	Reject Ho	DLEXGS~I(0)
LGDCF	ADF	1.4303	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LGDCF~I(1)
	PP	3.5096	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LGDCF~I(1)
D(LGDCF,1)	ADF	-6.6112***	-3.6210	-2.9434	-2.6103	Reject Ho	DLGDCF~I(0)
	PP	-6.5933***	-3.6210	-2.9434	-2.6103	Reject Ho	DLGDCF~I(0)
LREER	ADF	-1.5860	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LREER~I(1)
	PP	-1.5688	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LREER~I(1)
D(LREER,1)	ADF	-5.2706***	-3.6210	-2.9434	-2.6103	Reject Ho	DLREER~I(0)
	PP	-5.2711***	-3.6210	-2.9434	-2.6103	Reject Ho	DLREER~I(0)
LWGDP	ADF	0.8137	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LWGDP~I(1)
	PP	0.595 9	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LWGDP~I(1)
D(LWGDP,1)	ADF	-4.9607***	-3.6210	-2.9434	-2.6103	Reject Ho	DLWGDP~I(0)
	PP	-4.9823***	-3.6210	-2.9434	-2.6103	Reject Ho	DLWGDP~I(0)

"Ho: The series under consideration has a unit root"; "H1: The series under consideration is stationary".
Note: L stands for Logarithm (natural) of variables in levels; D stands for Variables in first differences.
The maximum number of lags included in Augmented Dickey Fuller (ADF) tests is 3. Both the tests include a constant (intercept).
*** Significant at a 1% level. ** Significant at a 5% level. * Significant at a 10% level.

Table 7.2: KPSS Stationarity Tests (1970-71 to 2008-09)

Series	LM-Statistics values at 1%	Asymptotic critical values at 5%	Asymptotic critical values at 10%	Asymptotic critical	Result	Conclusion
LRGDP	0.7595***	0.7390	0.4630	0.3470	Reject Ho	LRGDP is not I(0)
LEXGD	0.7701***	0.7390	0.4630	0.3470	Reject Ho	LEXGD is not I(0)
LEXGS	0.7660***	0.7390	0.4630	0.3470	Reject Ho	LEXGS is not I(0)
LGDCF	0.7563***	0.7390	0.4630	0.3470	Reject Ho	LGDCF is not I(0)
LREER	0.6908**	0.7390	0.4630	0.3470	Reject Ho	LREER is not I(0)
LWGDP	0.6752**	0.7390	0.4630	0.3470	Reject Ho	LWGDP is not I(0)

"Ho: The series under consideration is I(0) or stationary"; "H1: The series under consideration is non-stationary".

Note: L stands for Logarithm (natural) of variables in levels.

The test includes a constant (intercept).

Bandwidth selection is based on Newey-West.

*** Significant at a 1% level. ** Significant at a 5% level. * Significant at a 10% level.

Screenshot 1A: OLS Regression Result

Dependent Variable: LRGDP

Sample: 1970-71 to 2008-09; No. of Observations: 39

Variable	Coefficient	t-Statistic
C	9.1115	69.1888
LEXGD	0.4897	36.5009

R-squared: 0.9730

S.E. of regression: 0.0987

Durbin-Watson stat: 0.2721

F-statistic: 1332.32

Screenshot 1B: OLS Regression Result		
Dependent Variable: LRGDP Sample: 1970-71 to 2008-09; No. of Observations: 39		
Variable	**Coefficient**	**t-Statistic**
C	9.2943	70.4304
LEXGS	0.4586	35.0490
R-squared: 0.9708 S.E. of regression: 0.1027 Durbin-Watson stat: 0.2139 F-statistic: 1228.43		

Screenshot 2A: ADF Test Result			
"Null Hypothesis: R-LRGDP-LEXGD has a unit root" Exogenous: Constant Lag Length: 3 (Automatic based on AIC, MAXLAG=3)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic -		2.8336	0.0639
Test critical values:	1% level	-3.6329	
	5% level	-2.9484	
	10% level	-2.6129	
*MacKinnon (1996) one-sided p-values.			

Screenshot 2B: ADF Test Result			
"Null Hypothesis: R-LRGDP-LEXGS has a unit root" Exogenous: Constant Lag Length: 3 (Automatic based on AIC, MAXLAG=3)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-2.6676	0.0890
Test critical values:	1% level	-3.6156	
	5% level	-2.9412	
	10% level	-2.6091	
*MacKinnon (1996) one-sided p-values.			

The residuals of the regression equations (7.1) and (7.2) are tested for the Unit Roots. The results of ADF statistics indicate that, the null hypothesis of 'no cointegration' between GDP and exports is rejected at 10 per cent level **(Screenshot 2)**.

In the main case under scrutiny: the ELG hypothesis represented by cointegration sub-tests are able to find evidence in favour of long run relationship between real GDP and exports independently of other variables in case of the Indian economy.

When variables are cointegrated, the OLS estimates from the cointegrating regression will be super consistent, implying that the estimates approach their true parameters at a faster rate than if the variables were stationary and not cointegrated (Gujarati, 2003).

The presence of a cointegrating relationship forms the basis of error correction specification. One can treat error term as equilibrium error.

Error Correction Model: Empirical Estimates

The equation for testing the error correction model is:

$$DLRGDP=\beta_2\ DLEXGD+\beta_2 u_{t-1}+\varepsilon_t \quad (7.3)$$
$$DLRGDP=\beta_2\ DLEXGS+\beta_2\ u_{t-1}+\varepsilon_t \quad (7.4)$$

where D as usual denotes the first difference operator. ECM equation states that DLRGDPdepend on DLEXGDand also on the equilibrium error term u_{t-1}, i.e., one period lagged value of the error from the cointegrating regression. The absolute value of β_2 decides how quickly the equilibrium is restored. The result is presented in **Screenshot 3**.

Screenshot 3A: Error Correction Model Result

Dependent Variable: DLRGDP
Sample (adjusted): 1971-72 to 2008-09
No. of observations: 38 after adjustments

Variable	Coefficient	t-Statistic	Prob.
DLEXGD	0.3155	7.1211	0.0000
R-LRGDP-LEXGD(-1)	-0.1739	-2.6035	0.0133

R-squared: -0.6237
S.E. of regression: 0.0391
Durbin-Watson stat: 1.8183

Screenshot 3B: Error Correction Model Result			
Dependent Variable: DLRGDP Sample (adjusted): 1971-72 to 2008-09 No. of observations: 38 after adjustments			
Variable	Coefficient	t-Statistic	Prob.
DLEXGS	0.3096	7.6026	0.0000
R-LRGDP-LEXGS(-1)	-0.1443	-2.3524	0.0242
R-squared: -0.505251 S.E. of regression: 0.037637 Durbin-Watson stat: 1.797727			

In both the above cases, the coefficients of the error correction term have the desired sign (negative). About 17 per cent of disequilibrium is corrected every year in case of cointegration between 'exports of goods and GDP'; and about 14 per cent disequilibrium is corrected every year in case of 'goods and services'. The significance of the error correction term at 5% level confirms that exports and GDP are cointegrated in the long run and error correction takes place in the short run.

One of the major drawbacks of Engle-Granger approach is that it can estimate only up to one cointegrating relationship between the variables. But in other situations, if there are more variables, there could potentially be more than one linearly independent cointegrating relationship. Thus it is appropriate to examine the issue of cointegration within the Johansen's VAR framework.

Johansen Cointegrating Systems based on VAR

The Johansen procedure is a multiple equation method that permits the identification of the cointegration space, which enables the testing of how many cointegration relationships exist. LRGDP, LEXGS, LGDCF, LREER and LWGDP are tested under Johansen's technique and results displayed in **Screenshot 4**.

The trace test in Screenshot 4 indicates that the test statistics of 124.02 considerably exceeds the critical value 69.82 and so the null of no cointegrating vectors is rejected. This continues, until we do not reject the null hypothesis of at most 2 cointegrating vectors at the 5% level. The max test also confirms this result.

Suppose we want to test the hypothesis that the LREER and LWGDP do not

Screenshot 4A: Johansen Cointegration Test Result

Sample (adjusted): 1974-75 to 2008-09
No. of observations: 35 after adjustments
Trend assumption: Linear deterministic trend
Series: LRGDP LEXGD LGDCF LREER LWGDP
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.748950	107.3184	69.81889	0.0000
At most 1 *	0.497694	58.94472	47.85613	0.0033
At most 2 *	0.433178	34.84559	29.79707	0.0120
At most 3	0.331463	14.97573	15.49471	0.0597
At most 4	0.024900	0.882533	3.841466	0.3475

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.748950	48.37365	33.87687	0.0005
At most 1*	0.497694	24.09913	27.58434	0.1313
At most 2*	0.433178	19.86985	21.13162	0.0743
At most 3	0.331463	14.09320	14.26460	0.0532
At most 4	0.024900	0.882533	3.841466	0.3475

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Screenshot 4B: Johansen Cointegration Test Result

Sample (adjusted): 1974-75 to 2008-09
No. of observations: 35 after adjustments
Trend assumption: Linear deterministic trend
Series: LRGDP LEXGS LGDCF LREER LWGDP
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.8019	124.0243	69.8189	0.0000
At most 1 *	0.5780	67.3487	47.8561	0.0003
At most 2 *	0.4833	37.1484	29.7971	0.0059
At most 3	0.3028	14.0348	15.4947	0.0820
At most 4	0.0393	1.40617	3.8415	0.2357

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.8019	56.6756	33.8769	0.0000
At most 1 *	0.5780	30.2003	27.5843	0.0225
At most 2 *	0.4833	23.1136	21.1316	0.0260
At most 3	0.3029	12.6287	14.2646	0.0892
At most 4	0.0394	1.4062	3.8415	0.2357

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

appear in the cointegrating equation. We could test this by specifying the restriction that their parameters are zero. In this case there are two restrictions, so that the test statistics follows a Chi-square distribution with 2 degrees of freedom. The p-value for the test is 0.0004, so the restrictions are not supported by the data and we could conclude that the cointegrating relationship must also include the LREER and LWGDP **(Screenshot 5)**. The result thus demonstrate that the considered variables are cointegrated in that there is a long-run equilibrium relationship among them (these series cannot move too far away from each other or they cannot move independently of each other). The fact that the variables are cointegrated implies that there is some adjustment process in the short run, preventing the errors in the long run relationship from becoming larger and larger.

Granger Causality Test: Empirical Finding

The Null Hypothesis (Ho) in each case is: the variable under consideration does not Granger cause the other variable.

The result in **Table 7.3** suggest that the direction of causality is from export growth to GDP growth; since the estimated F-statistics is significant, at the 5% level up to 4 lags, at the

Screenshot 5A: Vector Error Correction Estimates

Sample (adjusted): 1974-75 to 2008-09
No. of observations: 35 after adjustments
Cointegration Restrictions:
B(1,4)=0, B(1,5)=0
Convergence achieved after 10 iterations.
Not all cointegrating vectors are identified
LR test for binding restrictions (rank = 1):
Chi-square(2): 16.80826
Probability: 0.000224

Cointegrating Eq:	CointEq1
LRGDP(-1)	2.293244
LEXGD(-1)	6.076050
LGDCF(-1)	-12.08954
LREER(-1)	0.000000
LWGDP(-1)	0.000000
C	59.60599

Screenshot 5B: Vector Error Correction Estimates

Sample (adjusted): 1974-75 to 2008-09
No. of observations: 35 after adjustments
Cointegration Restrictions:
B(1,4)=0, B(1,5)=0
Convergence achieved after 10 iterations.
Not all cointegrating vectors are identified
LR test for binding restrictions (rank = 1):
Chi-square(2): 15.55530
Probability: 0.000419

Cointegrating Eq:	CointEq1
LRGDP(-1)	5.992756
LEXGS(-1)	5.299681
LGDCF(-1)	-14.34167
LREER(-1)	0.000000
LWGDP(-1)	0.000000
C	42.55284

Table 7.3A: Granger Causality Test between DLRGDP and DLEXGD				
Direction of Causality	**No. of Lags**	**F-Statistic**	**Probability**	**Decision Regarding Ho**
Exports → GDP	1	6.95666	0.01250	Rejected
GDP → Exports	1	0.69292	0.41098	Not Rejected
Exports → GDP	2	3.62001	0.03864	Rejected
GDP → Exports	2	1.69715	0.19979	Not Rejected
Exports → GDP	3	3.34858	0.03308	Rejected
GDP → Exports	3	1.80044	0.17001	Not Rejected
Exports → GDP	4	3.33842	0.02542	Rejected
GDP → Exports	4	0.88408	0.48770	Not Rejected
Exports → GDP	5	2.39229	0.07073	Rejected
GDP → Exports	5	0.81603	0.55113	Not Rejected
Exports → GDP	6	1.87782	0.13730	Not Rejected
GDP → Exports	6	1.07856	0.40961	Not Rejected
Note: Variables are in Δlogs.				

Table 7.3B: Granger Causality Test between DLRGDP and DLEXGS				
Direction of Causality	**No. of Lags**	**F-Statistic**	**Probability**	**Decision Regarding Ho**
Exports → GDP	1	8.58354	0.00602	Rejected
GDP → Exports	1	0.10059	0.75306	Not Rejected
Exports → GDP	2	5.14572	0.01176	Rejected
GDP → Exports	2	0.63338	0.53753	Not Rejected
Exports → GDP	3	4.06956	0.01614	Rejected
GDP → Exports	3	0.70741	0.55568	Not Rejected
Exports → GDP	4	4.13654	0.01045	Rejected
GDP → Exports	4	0.32326	0.85968	Not Rejected
Exports → GDP	5	3.31053	0.02225	Rejected
GDP → Exports	5	0.40970	0.83686	Not Rejected
Exports → GDP	6	2.75318	0.04251	Rejected
GDP → Exports	6	0.78254	0.59400	Not Rejected
Note: Variables are in Δlogs.				

10% level at lag 5. On the other hand, there is no "reverse causation" from GDP growth to export growth, since the F-statistics is statistically insignificant. It can be assessed that, at lag 6, there is no statistically discernible relationship between the two variables. This reinforces the point made earlier that the outcome of the Granger test is sensitive to the number of lags introduced in the model. In the next Table, we have presented the Granger causality between GDP and Exports of Goods and services. This indicates that one can use exports to better predict the GDP than simply by the past history of GDP.

Block Exogeneity/Granger Causality in VAR: Empirical Estimates

The first step in the construction of any VAR model, once the variables that will enter the VAR have been decided, will be to determine the appropriate lag length. This can be achieved in a variety of ways, but one of the easiest is to employ a multivariate information criterion **(Screenshot 6)**. E Views Vession 5 presents the values of various information criteria and other methods for determining the lag order. In this case, the Schwartz criteria select a zero order as optimal, while Akaike's and Hannan-Quinn criterion chooses VAR(5).

Screenshot 6: VAR Lag Order Selection Criteria

Endogenous variables: DLRGDP, DLEXGS, DLGDCF, DLREER, DLWGDP
Exogenous variables: Constant
Sample: 1970-71 to 2008-09
Included observations: 33

Lag	LogL	LR	FPE	AIC	SC	HQ
0	232.4803	NA	7.08e-13	-13.78668	-13.55994*	-13.71039
1	268.5359	59.00008*	3.70e-13	-14.45672	-13.09626	-13.99897
2	289.1497	27.48505	5.40e-13	-14.19089	-11.69671	-13.35167
3	311.7413	23.27616	8.53e-13	-14.04492	-10.41703	-12.82425
4	361.5677	36.23744	3.86e-13	-15.54956	-10.78794	-13.94742
5	421.2525	25.32083	2.39e-13*	-17.65167*	-11.75634	-15.66807*

* 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

Screenshot 7: VAR Granger Causality/Block Exogeneity Wald Tests			
Sample period: 1970-71 to 2008-09 Included observations: 36			
Dependent variable: DLRGDP			
Excluded	**Chi-sq**	**df**	**Prob.**
DLEXGS	6.571840	2	0.0374
DLGDCF	1.930558	2	0.3809
DLREER	1.145787	2	0.5639
DLWGDP	0.570733	2	0.7517
All	13.05493	8	0.1100
Dependent variable: DLEXGS			
DLRGDP	4.335449	2	0.1144
DLGDCF	1.992873	2	0.3692
DLREER	0.243723	2	0.8853
DLWGDP	5.318795	2	0.0700
All	10.36116	8	0.2406
Dependent variable: DLGDCF			
DLRGDP	4.388943	2	0.1114
DLEXGS	4.610782	2	0.0997
DLREER	2.158529	2	0.3398
DLWGDP	0.090009	2	0.9560
All	9.672450	8	0.2888
Dependent variable: DLREER			
DLRGDP	0.850660	2	0.6536
DLEXGS	0.993505	2	0.6085
DLGDCF	2.986425	2	0.2246
DLWGDP	1.981283	2	0.3713
All	6.374739	8	0.6053
Dependent variable: DLWGDP			
DLRGDP	10.70434	2	0.0047
DLEXGS	3.213572	2	0.2005
DLGDCF	1.462160	2	0.4814
DLREER	2.041921	2	0.3602
All	25.79547	8	0.0011

Following the lag order selection criteria, we have tested Granger causality/Block Exogeneity in VAR framework. The result indicates lead-lag relationship between exports and GDP and Granger causality is significant at 5% level from exports of Goods and Services to GDP; 'significant at 10% from exports to GDCF' but no causality in the opposite direction **(Screenshot 7)**. The result can be interpreted as movements in the exports of goods and services appear to lead that of GDP in case of Indian economy.

8 NEXUS BETWEEN CAPITAL FLOWS AND GROWTH

Our objective in this chapter is to examine the importance of capital inflows as a determinant of economic growth in Indian economy. As capital inflows have mainly gone to non-agricultural sector, we try to examine the hypothesis: net capital inflows (capital flows henceforth) have contributed to growth in non-agricultural GDP. The data set is annual and covers the period from 1970-71 to 2008-09. The same methodology is adapted here, as was in Chapter 7, and its specification is provided in Appendix.

In the empirical analysis of nexus between capital flows and growth, the dependent variable is Real GDP net of 'agriculture and allied activities', i.e., non-agricultural GDP (NAGDP). The choice of dependent variable NAGDP is dictated by the fact that capital inflows basically absorbed in industrial and services sectors. The following explanatory/independent variables are selected largely on the basis of literature survey. The data description and their specifications in empirical analysis are as follows.

- CAPFL: Net Capital Flows; consisting Foreign Investment, Loans, Banking Capital and Other Capital (including Rupee Debt Service) in US$ terms;
- ECAP: Excess Capital Flow over Current Account Balance in US$ terms;
- GDCF: Gross Domestic Capital Formation (in Rupees Crore, at constant base prices of 1999-2000);
- MONEY: Reserve Money (M0)

  NFEA: Net Foreign Exchange Assets of the RBI (in Rupees crore),
- WPI: Wholesale Price Index (Base 1993-94=100)
- REER: Index of Real Effective Exchange Rate (6 country trade-based weights; 1993-94=100)

The above variables are subjected to logarithmic transformations except the excess capital flow over current account balance, which includes negative values in the series. The prefix 'L' stands for the natural logarithm of the respective time series, 'R' stands for the residuals of the respective regression, and 'D' denotes differencing of the relevant time series.

Table 8.1: ADF Unit Root Test (1970-71 to 2008-09)							
Series	**Type**	**Test-Statistics**	**T-critical at 1%**	**T-critical at 5%**	**T-critical at 10%**	**Result**	**Conclusion**
LCAPFL	ADF	-0.8297	-3.6394	-2.9511	-2.6143	Don't Reject Ho	LCAPFL~I(1)
D(LCAPFL,1)	ADF	-5.9132***	-3.6537	-2.9571	-2.6174	Reject Ho	DLCAPFL~I(0)
LECAP	ADF	3.4246	-3.6329	-2.9484	-2.6129	Don't Reject Ho	LECAP~I(1)
D(LECAP,1)	ADF	-6.8367***	-3.6463	-2.9540	-2.6158	Reject Ho	DLECAP~I(0)
LGDCF	ADF	1.4303	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LGDCF~I(1)
D(LGDCF,1)	ADF	-6.6112***	-3.6210	-2.9434	-2.6103	Reject Ho	DLGDCF~I(0)
LMONEY	ADF	-0.0008	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LMONEY~I(1)
D(LMONEY,1)	ADF	-5.6381***	-3.6210	-2.9434	-2.6103	Reject Ho	DLMONEY~I(0)
LNAGDP	ADF	5.3519	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LNAGDP~I(1)
D(LNAGDP,1)	ADF	-3.2715**	-3.6210	-2.9434	-2.6103	Reject Ho	DLNAGDP~I(0)
LNFEA	ADF	-0.2719	-3.6210	-2.9434	-2.6103	Don't Reject Ho	LNFEA~I(1)
D(LNFEA,1)	ADF	-4.2639***	-3.6210	-2.9434	-2.6103	Reject Ho	DLNFEA~I(0)
LREER	ADF	-1.5860	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LREER~I(1)
D(LREER,1)	ADF	-5.2706***	-3.6210	-2.9434	-2.6103	Reject Ho	DLREER~I(0)
LWPI	ADF	-2.0082	-3.6156	-2.9411	-2.6091	Don't Reject Ho	LWPI~I(1)
D(LWPI,1)	ADF	-4.3575***	-3.6210	-2.9434	-2.6103	Reject Ho	DLWPI~I(0)

"Ho: The series under consideration has a unit root"; "H1: The series under consideration is stationary".

Note: L stands for Logarithm (natural) of variables in levels; D stands for Variables in respective differences.

The maximum number of lags included in Augmented Dickey Fuller (ADF) tests is 3. The tests include a constant (intercept).

*** Significant at a 1% level. ** Significant at a 5% level. * Significant at a 10% level.

Empirical Estimates and Analysis of Results

In order to pre-empt the possibility of running a spurious regression, we first test the time-series properties of the variables used in this empirical analyis. Time series univariate properties were examined using ADF test $(\Delta Y_t=\alpha_0+\delta Y_{t-1}+u_t)$ having the maximum lag length of 3 based on the Akaike Information Criterion (AIC).

The result is provided in **Table 8.1**. All the variables are found to be non-stationary at log levels and become stationary in its first difference level - the chosen variables are found to be / (1) at log levels.

The equation we have tested is:

$LNAGDP=\alpha+\beta LCAPFL+u_t$ (8.1)

The result of OLS regression is displayed in **Screenshot 8.1**.

Screenshot 8.1: OLS Regression Result

Dependent Variable: LNAGDP
Sample: 1970-71 to 2008-09; No. of Observations: 39

Variable	Coefficient	t-Statistic
C	9.4420	32.6085
LCAPFL	0.4873	14.2663

R-squared: 0.8497
S.E. of regression: 0.2749
Durbin-Watson stat: 1.2981
F-statistic: 203.5300

Screenshot 8.2: ADF Test Result

Null Hypothesis: R-LNAGDP-LCAPFL has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.4864	0.0140
Test critical values:	1% level	-3.6210	
	5% level	-2.9434	
	10% level	-2.6103	

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

The residuals of the above mentioned regression equations are tested for the Unit Roots. **(Screenshot 8.2)** The cointegration tests are able to find evidence in favour of long run relationship between net capital flow and non-agricultural GDP in case of the Indian economy. Following the cointegration test, we have tested these two variables under error correction model (ECM). The positive value of the first difference of the residuals indicates the model is out of equilibrium.

We have tested our variables in Johansen's cointegration system under VAR that identifies cointegration space that enables the testing of how many cointegration relationships exist. The trace test indicates that the test statistics of 160.4 exceeds the critical value 125.6 and so the null of no cointegrating vectors is rejected **(Screenshot 8.4)**. This continues, until we do not reject the null hypothesis of at most 2 cointegrating vectors at the 5% level. The max test, however, settles at none.

Now we turn to test the Granger causality in bivariate and multivariate VAR framework. The Null Hypothesis is: the variable under consideration does not Granger cause the other variable.

Screenshot 8.3: Error Correction Model Result

Dependent Variable: DLNAGDP

Sample (adjusted): 1971-72 to 2008-09

No. of observations: 36 after adjustments

Variable	Coefficient	t-Statistic
C	0.0631	17.5643
DLCAPFL	0.0124	1.6158
R-LNAGDP-LCAPFL (-1)	0.0274	1.5292

R-squared: 0.0822

S.E. of regression: 0.0214

Durbin-Watson stat: 1.0385

F-statistic: 1.4784

Screenshot 8.4: Johansen Cointegration Test Result

No. Of observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: DLCAPFL DLGDCF DLMONEY DLNAGDP DLNFEA DLREER DLWPI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.8083	160.4396	125.6154	0.0001
At most 1 *	0.6877	107.5793	95.7537	0.0060
At most 2 *	0.5656	70.3422	69.8189	0.0454
At most 3	0.4809	43.6589	47.8561	0.1173
At most 4	0.3822	22.6723	29.7971	0.2626
At most 5	0.1314	7.2592	15.4947	0.5477
At most 6	0.0824	2,7516	3.8415	0.0972

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.8083	52.8602	46.2314	0.0086
At most 1	0.6877	37.2371	40.0776	0.1010
At most 2	0.5656	26.6834	33.8769	0.2807
At most 3	0.4809	20.9866	27.5843	0.2770
At most 4	0.3822	15.4131	21.1316	0.2610
At most 5	0.1314	4.5075	14.2646	0.8023
At most 6	0.0824	2.7516	3.8415	0.0972

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 8.2: Granger Causality between DLNAGDP and DLCAPFL				
Direction of Causality	**No. of Lags**	**F-Statistic**	**Probability**	**Decision**
DLCAPFL → DLNAGDP	1	0.01613	0.89975	Not Rejected
DLNAGDP → DLCAPFL	1	0.33438	0.56727	Not Rejected

The result in **Table 8.2** suggests that coefficients are not statistically significant in both the regression. Thus, there is independence between non-agricultural GDP and net capital flows in case of Indian economy. It suggests that, we cannot use the net capital flows to predict the growth of GDP or vice versa.

9 CONCLUSIONS

The major findings and conclusion from the study can be summarised as follows:

1. The review of trade theories starting from the Mercantilism and ending with New Trade models focuses on three dimensions: (1) Export as a leading sector; (2) Export as a balancing sector; and, (3) Export-linked import liberalization in both developed and developing countries. In a nutshell, theories of trade explain how the differences between countries give rise to trade and gains from trade.

2. The IMF, World Bank, and the WTO share the common goal of facilitating/promoting the balanced expansion of trade in goods and services. Responsibilities for trade issues are divided among the three institutions - roughly speaking, the IMF focuses on the overall macroeconomic policy framework and balance of payments disequilibria, the World Bank on long-term development and sectoral trade issues, and the WTO on rules for multilateral trade liberalization and transparency. Each of the three institutions has a mandate for cooperation.

3. The ILO is supposed to ensure labour standards and setting minimum standards of basic labour rights. With the enlarging role of the private sector and the pursuit of competitiveness particularly in the sphere of global trade have been accompanied by violations of labour standards and occasionally have also become the grounds for restriction of trade. In view of this, the role of ILO also assumes significance in the arena of trade and problems confronting migrant labour.

4. From being one of the prime opponents of the inclusion of services in the UR negotiations, India has of late emerged as a leading proponent of the services trade liberalization under the GATS. The focus of services trade has shifted from facilitating trade in goods to trade in services as an independent entity in itself with the four modes of supply for the delivery of services in cross-border trade.

5. The major impacts of international labour migration from India on the balance of payments were through remittance inflows, which financed a large part of trade deficits, and through repatriable

deposits, which financed part of the current account deficits. It is of course, difficult to disentangle the impact of migration on exports and growth.

6. Econometric analysis of the nexus between exports and GDP growth by applying ADF and PP tests suggests that all the macroeconomic variables under consideration are I(1) at log levels and become stationary at first difference. The ADF test on the residuals of the regression equation of log of exports on the log of GDP confirms stationarity of the variables and indicates the long run relationship between these variables.

7. The bivariate error correction model indicates that, about 17 per cent of disequilibrium is corrected every year in case of exports of goods and GDP; and about 14 per cent disequilibrium is corrected every year in case of 'exports of goods and services' and GDP. The significance of the error correction term at 5% level suggesting the robust relationship. This reinforces the nexus between export and GDP growth in both short and long run.

8. In subsequent specification of restriction under Vector Error Correction Model (VECM) in VAR, the result demonstrate that the variables considered in analysis are cointegrated, in that there is a long-run equilibrium relationship among them (these series cannot move too far away from each other or they cannot move independently of each other). The fact that the variables are cointegrated implies that there is some adjustment process in the short run, preventing the errors from becoming larger and larger in the long run.

9. The test of Granger causality suggests that the direction of causality is from export growth to GDP growth but there is no "reverse causation" from GDP growth to export growth. This implies that one can use exports to predict the GDP growth better way than simply by the past history of GDP growth.

10. The results in Granger causality / Block Exogeneity in VAR framework indicate movements in the exports of goods and services appear to lead that of GDP in case of Indian economy. Given the recent success of software exports from India along with the 'focus area approach' to merchandise exports including its diversification, the finding is plausible and consistent with prior expectation that increasing exports – both merchandise and services stimulates economic growth.

11. The cointegration tests are able to find evidence in favour of long run relationship between net capital flow and growth in Indian economy.

However, the positive value of the first difference of the residuals indicates the equilibrium model is not fitting well.

12. The Granger causality results, however, do not point out to the temporal causation between capital inflows and growth. Hence, based on these tests neither we can make any claims about the predictability of growth from capital inflows nor we can infer whether capital inflows have been due to pull factors.

Scope for Further Research

One of the major limitations of the study is the weak explanation for the impact of *import* on the growth of GDP. A useful extension may include productivity in manufacturing with a structural analysis of the contemporaneous error structure. The future study may examine, whether international trade can be a powerful positive force in the reduction of poverty and inequality in developing countries by creating jobs, especially for unskilled workers, and by reducing the inequality between workers of different skills and educational levels, and between different regions of India. The increased integration with the world economy can potentially reduce poverty through the creation of new jobs in export industries. However, greater openness also brings increased competition from imports for previously protected industries. This can lead to job losses in certain sectors, with workers falling into poverty as a result of retrenchment. Whether globalization creates or destroys jobs, and who are the winners and losers in employment is ultimately an empirical issue that can be taken up for further research.

APPENDIX

Description of Methodology *

(i) Stationarity Tests

Before the testing for a causal relationship between the time series, the first step is to check the stationarity of the variables used in the models to be estimated. The aim is to verify whether a series stationary or non-stationary and to identify the order of integration of the variables used in the model. The importance of stationarity feature of the series is that the impact of shocks to a stationary time series dissipates in the long run. The identification of the order of integratedness of a series helps to avoid estimation of spurious regressions.

A time series is said to be strictly stationary, if the joint distribution of X_{t1} , X_{t2} ,… ,X_{tn} is the same as the joint distribution of $X_{t1+\tau}, X_{t2+\tau}, \ldots, X_{tn+\tau}$ for all t_1, t_2,… ,t_n, and τ. The distribution of the stationary process remains unchanged when shifted in time by an arbitrary value τ. Thus the parameters which characterize the distribution of the process do not depend on *t*, but on the lag τ. The mean and variance of X_t are constant and the covariances of X_t depend only on the lag or difference $\tau = t_1 - t_2$, not on t_1 or t_2.

(a) Unit Root Test

Dickey-Fuller (DF) test (Dickey and Fuller, 1979) is based on independently and identically distributed (iid) errors. In the following discussions, we have briefly touched upon the specification of a unit root process based on Enders (2004) and Brooks (2008). The basic objective of the test is to examine the null hypothesis that the series Y_t contains a unit root, *i.e.,* $\phi=1$. Suppose we are given an AR(1) process, as specified in equation 7.1

$$Y_t = \phi Y_{t-1} + u_t \qquad -1 \leq \phi \leq 1 \qquad (7.1)$$

where u_t is a white noise error term. If $\phi=1$, that is, in the case of a unit root, equation (7.1) becomes a random walk model without drift, which is a non-stationary stochastic process. Thus, the null hypothesis or *H0* is: "Series Y_t *contains a unit root*" versus alternative hypothesis *"*H_1*:* Y_t series is stationary".

Substracting Y_{t-1} from both the sides of equation (7.1), we obtain equation

* It may be mentioned that, this section draws heavily on Books (2008), where a neat description of these methods have been provided.

(7.2) or (7.2a) as follows.

$$Y_t - Y_{t-1} = \phi Y_{t-1} - Y_{t-1} + u_t \quad (7.2)$$
$$= (\phi - 1) Y_{t-1} + u_t \quad (7.2a)$$

Equation (7.2a) can be alternatively written as equation (7.3) as

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad (7.3)$$

where $\delta = (\phi - 1)$ and Δ as usual is the first difference operator. This transformation of coefficients from ϕ to δ enables us to test the hypothesis as to whether the coefficient of Y_{t-1} are statistically significantly different from zero or not.

The three types of non-stationary series and the methods for testing for the presence of a unit roots in time series as described by Enders (2004) are presented in equations (7.3) to (7.5).

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + u_t \quad (7.4)$$
$$\Delta Y_t = \alpha_0 + \delta Y t_{-1} + \alpha_2 t + u_t \quad (7.5)$$

Equation (7.3) describes a non-stationary series process which can be made stationary after differencing it once. It is a pure random walk model and it neither contains a drift (intercept) nor a deterministic trend (captured by time variable t). Equation (7.4) has a drift but no trend and equation (7.5) has both a drift and the linear trend. The parameter of interest in the regression equations (7.3) to (7.5) is δ, if δ=0, the {Y_t } sequence contains a unit root. The null hypothesis of presence of a unit root in series Y_t is rejected in favour of the alternative hypothesis of stationary in each of the above equations, if the test statistics τ is more negative than the critical value at a given level of significance.

The Augmented Dickey-Fuller (ADF) tests here consist of estimating the regression equation (7.6).

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta Y_{t-i+1} + u_t \quad (7.6)$$

where $\delta = -(1 - \sum_{i=1}^{p} \alpha_i$

$\beta_i = \sum_{j=i}^{p} \alpha_j$

u_t *is a pure wh*ite noise term.

$\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, and so on. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated.

For conducting the the Phillips-Peron (1988) test we specify the following regression equations:

$$Y_t = \alpha_0^* + \alpha_1^* Y_{t-1} + \mu_t \quad (7.7)$$

and $Y_t = \tilde{\alpha_0} + \tilde{\alpha_1} Y_{t-1} + \tilde{\alpha_2} (t - T/2) + \mu_t$ (7.8)

where T = number of observations and the disturbance term μ_t is such that $E\mu_t = 0$, but there is no requirement that the disturbance

term is serially uncorrelated or homogeneous. Instead of DF assumptions of independence and homogeneity, the PP test allows the disturbances to be weakly dependent and heterogeneously distributed.

PP Test characterise the distributions and derive test statistics that can be used to test hypotheses about the coefficients α_i^* and $\tilde{\alpha}_i$ under the null hypothesis that the data are generated by

$$Y_t = Y_{t-1} + \mu_t \qquad (7.9)$$

The PP test statistics are modifications of the Dickey-Fuller t-statistics that take into account the less restrictive nature of the error process. The critical values for the PP statistics are precisely those given for the DF tests.

A Critique of the Unit Root Tests

There is a substantial literature concerning the appropriate use of the various DF tests statistics. The focus is on size and power of the test and presence of the deterministic regressors in the estimating equations. By size of a test we mean the level of significance (i.e., the probability of committing a Type I error) and by power of a test we mean the probability of rejecting the null hypothesis when it is false. The power of a test is calculated by substracting the probability of a Type II error from I; Type II error is the probability of accepting a false null hypothesis. *Most unit root tests are based on the null hypothesis that the time series under consideration has a unit root; that is, it is non-stationary. The alternative hypothesis is that the time series is stationary.*

Monte Carlo simulations have shown that the power of the various DF type and PP type tests is very low. They tend to accept the null of unit root more frequently than is warranted. That is, these tests may find a unit root even when none exist. There are several reasons for this:

- The power depends on the time span of the data more than mere size of the sample. The unit root tests based on 30 observations over a span of 30 years may have more power than that based on, say, 100 observations over a span of 100 days.
- If $\phi \approx 1$ but not exactly 1, the unit root test may identify such a time series non-stationary.
- These types of tests assume a single unit root; that is they assume that the given time series is I(1). But, if a time series is integrated of order higher than 1, say, I(2), there will be more than one unit root. In this case, one has to use the Dickey-Pantula test.
- If there are structural breaks in

a time series, the unit root tests may not fit properly.

The most important criticism that has been leveled at unit root tests is that their power is low if the process is stationary but with a root close to the non-stationary boundary.

(b) KPSS Test

The KPSS test differs from the other unit root tests described above in that the series Y_t is assumed to be (trend-) stationary under the null. This is the special case of a test for parameter consistency against the alternative that the parameters follow a random walk. The KPSS statistic is based on the residuals from the OLS regression of Y_t on the exogenous variable X_t:

$$Y_t = X_t' \delta + u_t \qquad (7.10)$$

The LM statistic is defined as:

$$LM = \sum_t S(t)^2 / (T^2 f_0) \qquad (7.11)$$

where f_0, is an estimator of the residual spectrum at frequency zero and where $S(t)$ is a cumulative residual function:

$$S(t) = \sum_{r=1}^{t} \hat{u}_t \qquad (7.12)$$

based on the residuals $\hat{u}_t = Y_t - X_t' \hat{\delta} t \quad (0)$. The estimator of δ used in this calculation differs from the estimator for δ used by GLS trending since it based on a regression involving the original data and not on the quasi-differenced data. The reported critical values for the LM test statistic are based upon the asymptotic results presented in Kwaitkowski et al., 1992. The results of these tests can be compared with the ADF/PP procedure to see if the same conclusion is obtained.

(ii) Cointegration Test: Residual Based approach

The residual-based tests were the earlier tests for cointegration discussed in detail by Engle and Granger (1987). A substantial part of economic theory generally deals with long run equilibrium relationships generated by market forces and behavioural rules. If such a stationary linear combination exists, the non-stationary time series are said to be cointegrated. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

In a single equation framework, assuming that $Y_i \sim I(1)$, the two-step estimation procedure by Engle and Granger (1987) involves the procedure as follows:

To test whether the series are cointegrated, the cointegration regression equation (7.13) is estimated by ordinary least square (OLS).

$$Y_t=\beta_1+\beta_2 X_{2t}+\beta_3 X_{3t}+u_t \quad (7.13)$$

For the estimated model, the SRF is as specified in equation (7.14).

$$Y_t=\hat{\beta}_1+\hat{\beta}_2 X_{2t}+\hat{\beta}_3 X_{3t}+\hat{u}_t \quad (7.14)$$

Keeping the residual on the right hand side, we get equation (7.15)

$$Y_t-\hat{\beta}_1-\hat{\beta}_2 X_{2t}-\hat{\beta}_3 X_{3t}=\hat{u}_t \quad (7.15)$$

Again, the residuals when expressed in this way can be considered a linear combination of the variables. We can perform an ADF test on the residual sequence to determine whether it has a unit root. If the residuals obtained by equation are found to be I(0), then the variables Y and X are cointegrated and have a long run relationship.

(iii) Error Correction Model

The error correction mechanism (ECM) was first used by Sargan (1984) and later popularized by Engle and Granger (1987). An important theorem known as Granger Representation Theorem states that if two variables Y and X are cointegrated, then the relationship between the two can be expressed as ECM. The error correction model takes the form of equation (7.16).

$$\Delta Y_t=\beta_1 \Delta X_t+\beta_2 (Y_{t-1} - \delta X_{t-1})+u_t \quad (7.16)$$

The equation (7.16) is known as an error correction model or an equilibrium correction model, and $(Y_{t-1}-\delta X_{t-1})$ is known as the *error correction term*. Provided that Y_t and X_t are cointegrated with cointegrating coefficient δ, then $(Y_{t-1}-\delta X_{t-1})$ will be *I(0)* even though Y_t and X_t are *I(1)*. The error correction term $(Y_{t-1})-\delta X_{t-1})$ appears with a lag. δ defines the long run relationship between *X* and *Y*, while β_1 describes the short-run relationship between changes in *X* and changes in *Y*. Broadly, β_2 describes the speed of adjustment back to equilibrium, i.e., it measures the proportion of last period's equilibrium error that is corrected.

However, since this is a test on residuals of a model $\hat{u}_t$, then the critical values are changed compared to a DF or an ADF test on a series of raw data. Engle and Granger (1987) have tabulated a new set of critical values for this application and hence the test is known as the Engle-Granger (EG) test. The reason that modified critical values are required is that the test is now operating on the residuals of an estimated model rather than on raw data. The residuals have been constructed from a particular set of coefficient estimates, and the sampling estimation error in those coefficients will change the distribution of the test statistic.

(iv) Johansen's Vector Error Correction Model (VECM) in VAR

Johansen (1995) developed a

maximum likelihood estimation procedure based on reduced rank regression method that has some advantage over the two-step regression procedure described earlier. It relaxes the assumption that the cointegrating vector is unique, and it takes into account the short-run dynamics of the 'system' whilst estimating the cointegrating vectors. A VAR estimation procedure is utilized in order to analyze the dynamic impact of random disturbances on the system of variables as follows.

$$Y_{1t} = \beta_{10} + \beta_{11} Y_{1t-1} + \ldots + \beta_{1k} Y_{1t-k} + \alpha_{11} Y2_{t-1} + \ldots + \alpha_{1k} Y_{2t-k} + u_{1t} \qquad (7.17)$$

$$Y_{2t} = \beta_{20} + \beta_{21} Y_{2t-1} + \ldots + \beta_{2k} Y_{2t-k} + \alpha_{21} Y_{1t-1}) + \ldots + \alpha_{2k} Y_{1t-k} + u_{2t} \qquad (7.18)$$

where u_{it} is a white noise disturbance term with

$$E(u_{it})=0,(i=1,2),E(u_{1t}\, u_{2t})=0$$

Instead of having only two variables as above, the system could be expanded to include g variables, $Y_{1t}, Y_{2t}, Y_{3t}, \ldots, Y_{gt}$ each of which has an equation.

A vector error correction model (VECM) is a restricted VAR designed for use with non-stationary series that are known to be cointegrated. The VECM has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics (Brooks, 2008). The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

In order to use the Johansen test, the above VAR needs to be turned into a VECM of the form as follows.

$$\Delta Y_t = \Pi Y_{t-k} + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2}) + \ldots + \Gamma_{k-1} \Delta Y_{t-(k-1)} + u_t \qquad (7.19)$$

where $\Pi=(\sum_{i=1}^{k} \beta_i - I_g$ and $\Gamma_i=(\sum_{j=1}^{i} \beta_j)-I_g$

This VAR contains g variables in first differenced form on the LHS, and k-1 lags of the dependent variables (differences) on the RHS, each with a Γ coefficient matrix attached to it. The Johansen test can be affected by the lag length employed in the VECM, and so it is useful to attempt to select the lag length optimally.

For the purpose of testing the number of cointegrating vectors, Johansen (1995) proposed the use of two likelihood ratio test statistics, viz., the trace test and the maximum eigenvalues test. The trace statistic for the null hypothesis of r cointegrating relations is computed as follows:

$\lambda_{trace}\ (r) = -T \sum_{i=r+1}^{g} ln(1-\hat{\lambda}_i -)$ (7.20)

$\lambda_{max}(r,r+1) = - T\ ln(1-\hat{\lambda}_{r+1})$ (7.21)

where r is the number of cointegrating vectors under the null hypothesis and $\hat{\lambda}_i$ is the estimated value for the *i-th* ordered eigenvalue from the *Π* matrix. Larger is $\hat{\lambda}_i$, the more large and negative will be ln($1-\hat{\lambda}_i$) and hence the larger will be the test statistic. Each eigenvalue will have a different cointegrating vector associated with it. A significantly non-zero eigenvalue indicates a significant cointegrating vector.

λ_{trace} is a joint test where the null is that the number of cointegrating vectors is less than or equal to *r* against the alternative that these are more than *r*. It starts with *p* eigenvalues, and then successively the largest one is removed. $\lambda_{trace}=0$ when all the $\lambda_i=0$, for *i=1,….., g.* λ_{max} conducts separate tests on each eigenvalue, and has as its null hypothesis that the number of cointegrating vectors is r against an alternative *r+1*.

If the test statistic is greater than the critical value from Johansen's tables, we reject the null hypothesis that there are *r* cointegrating vectors in favour of the alternative that are *r+1* (for λ_{trace}) or more than *r* (for λ_{max}).

The first test involves a null hypothesis of no cointegrating vectors (corresponding to *Π* having zero rank). If this null is not rejected, it would be concluded that there are no cointegrating vectors and the test is completed. However, if H_0: *r = 0* is rejected, the null that there is one cointegrating vector (i.e. H_0: *r = 1*) has to be tested and so on. Thus, the value of r is continually increased until the null is no longer rejected.

(v) Granger Causality Test

Although, regression analysis deals with dependence of one variable on the other, it does not necessarily imply causation. In other words, the existence of relationship between variables does not prove causality or the direction of influence (Gujarati, 2003). The Granger (1969) approach to the question of whether '*X* causes *Y*' is to see how much of the current *Y* can be explained by past values of *Y* and then to see whether adding lagged values of *X* can improve the explanation. '*Y* is said to be Granger-caused by *X*', if *X* helps in the prediction of *Y*, or equivalently if the coefficients on the lagged *X*'s are statistically significant. The two-way causation is frequently the case; '*X* Granger causes *Y*' and '*Y* Granger causes *X*'.

The Granger causality test introduced by Granger (1969) and Sims (1972) assume that the information relevant to the prediction of the respective variables is contained solely in the time series data on these variables.

The test involves estimating the following pairs of regressions:

$$Y_t=\sum_{i=1}^{n} \alpha_i X_{t-i}+\sum_{j=1}^{n}\beta_j Y_{t-j}+u_{1t} \quad (7.22)$$

$$X_t=\sum_{i=1}^{n} \lambda_i X_{t-i}+\sum_{j=1}^{n}\delta_j Y_{t-j}+u_{2t} \quad (7.23)$$

where it is assumed that the disturbances u_{1t} and u_{2t} are uncorrelated. Since we have two variables – GDP and Exports, we are dealing with bivariate causality. It is assumed that the two variables are stationary. Sometimes taking the first differences of the variables makes them stationary. The number of lagged terms to be introduced in the causality test is an important practical question. As in the case of distributed lag models, we have to use *Akaike or Schwarz Information Criterion to* make the choice. But it should be added that, the direction of causality may depend critically on the number of lag terms included. We also extended to multivariate causality through the technique of *Vector Auto Regressions (VARs)* by applying 'Block Exogeneity/Granger Causality Tests'.

(vi) Block Exogeneity/Granger Causality tests in VAR

The first step in the construction of any VAR model, once the variables that will enter the VAR have been decided, will be to determine the appropriate lag length. This can be achieved in a variety of ways, but one of the easiest is to employ a multivariate information criterion. EViews presents the values of various information criteria and other methods for determining the lag order. It is likely that, when a VAR includes many lags of variable, it will be difficult to see which sets of variables have significant effects on each dependent variable and which do not. In order to address this issue, tests are usually conducted that restrict all of the lags of a particular variable to zero.

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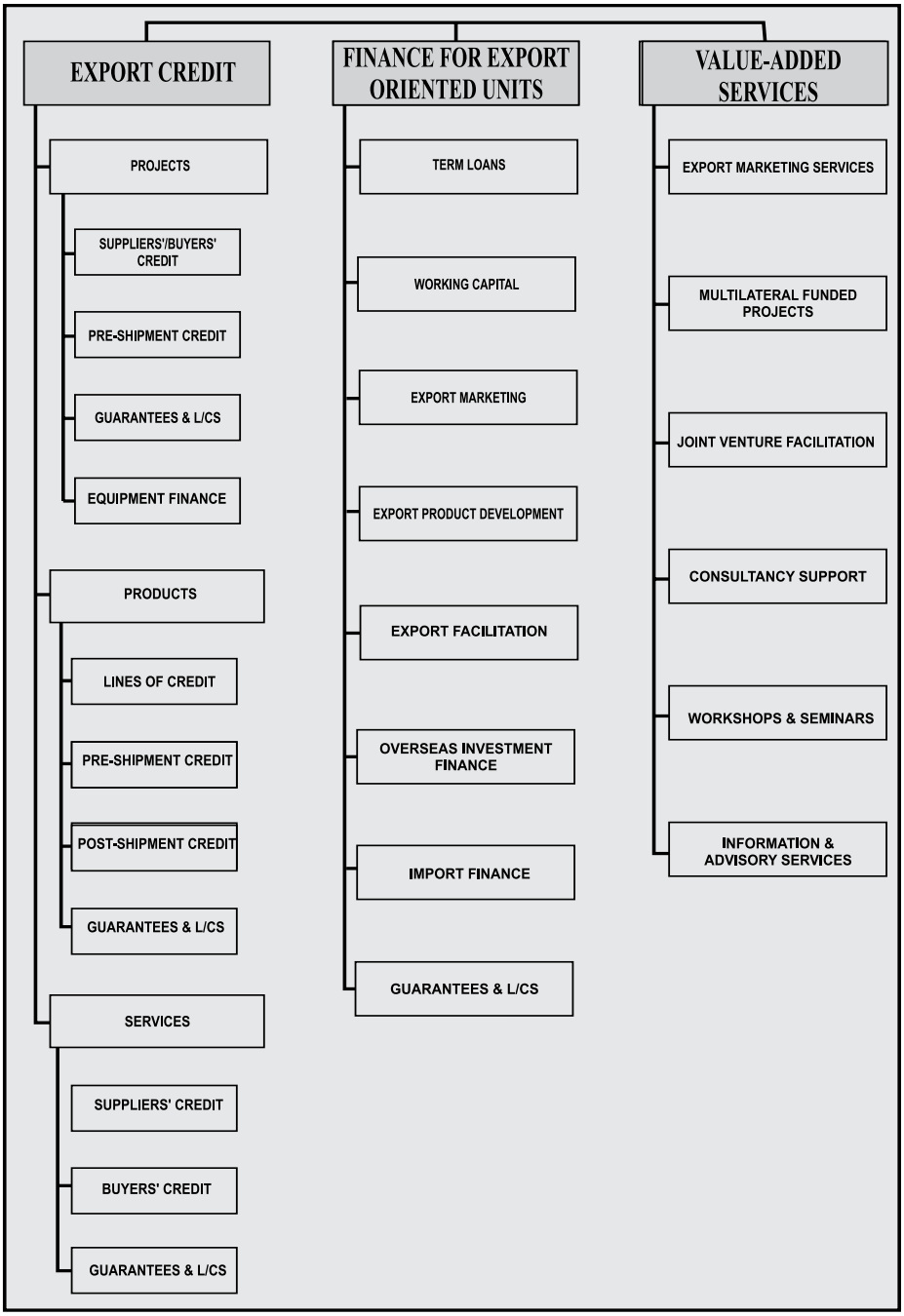

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