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Abstract

Purpose – The information technology (IT) sector in India is the leading exporter from the service sector domain and also is a significant contributor to the overall export kitty of India. The IT sector's contribution in total Indian exports (merchandise plus services) increased from less than 4 percent in FY1998-1999 to about 25 percent in FY2011-2012 as per IT industry nodal body National Association of Software and Services Companies and the central bank of the country, the Reserve Bank of India (RBI). As this industry earns most of its revenue in foreign currencies it is exposed to the foreign exchange risks. The purpose of this paper is to validate the macro-economic theory that depreciation in domestic currency boosts export as it makes domestic good and services cheaper and appreciation in domestic currency deters export as it makes domestic good and services costlier. The authors are validating this theory for Indian rupee and keeping software services export in the focus.

Design/methodology/approach – In this study the authors have done the multiple regression analysis on the obtained time-series data. The research was totally based on the secondary data from Quarter1 (April-June) of FY 2000-2001 to Quarter4 (January-March) of FY 2011-2012. It comprises of data for 48 consecutive quarters. The authors have taken the growth rate, so the final data set consist of data of 47 quarters. The main source of data are published data by RBI. Data have been collected for export of software services, merchandise export, real effective exchange rate, US-dollar-Indian rupee exchange rate, gross domestic product of India and selected countries.

Findings – Data analysis leads the authors to the following findings: real effective exchange rate has no significant impact on software services export; US-dollar-Indian rupee exchange rate has no significant impact on software services export; external gross domestic product growth has no significant impact on software services export; and gross domestic product growth of India has no significant impact on software services export. The results obtained from multiple regression analysis are also supported by the results obtained from Granger Causality test. It does not identify any single factor as a major cause of software export. Results shows that the external GDP is having the statistically significant impact on the software export but the low value of R^2 denotes that the impact is very low.

Originality/value – There are no published studies available which has attempted similar kind of an approach to study using aggregated export data and other macro-economic variables like real effective exchange rate (REER) and GDP growth rate. All previous literatures used REER to measure the impact of the exchange rate on export.

Keywords Performance, Strategic evaluation

Paper type Research paper

1. Introduction

Indian software industry witnessed a phenomenal growth in the last decade. In 1998-1999 which was a mere USD4.6 billion industry, has now become a giant USD108 billion industry in FY2012-2013 according to the industry body NASSCOM (National Association

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of Software and Services Companies). As a proportion of national GDP, the sector revenues have grown from 1.2 percent in FY1998 to an estimated 7.5 percent in FY2012. Export revenues estimated to reach USD69.1 billion in FY2012 growing by over 16 percent as reported by NASSCOM. This sector is also helping India to improve its current account deficit (CAD) which is at record high by bringing in revenues in foreign currencies.

As an export-oriented sector the profitability of the software industry is dependent on the prevailing exchange rates and also on the external growth, i.e. growth of countries where software the software export mainly take place. The external growth will create the demand for the software which in turn stimulates the growth of software services growth.

After the liberalization measures that took place in 1991 during the crises, India's exports gained momentum. India's trade to GDP ratio has increased from 15 percent in 1990 to 32.7 percent in FY2006-2007 to 43 percent in FY2012-2013. Exports-GDP ratio increased from 13.4 percent in FY 2006-2007 to 16.3 percent in FY 2012-2013. Simultaneously, India's overall share in total world trade has increased from 0.5 percent in 1990 to about 1.6 percent in 2012 with rank – 19, up from 26th in 2007 (www.eximbankindia.com/fore-trade.pdf).

During the period of 2000-2010 average growth of software export outpaced the growth of merchandise export. The software export growth rate was much ahead than merchandise export till 2009. After that it faced the impact of global meltdown. During 2009-2010 US GDP shrunk by 3.5 percent and Europe GDP shrunk by 4 percent. Those two regions are the two main regions of the software export from India. That brought down the growth rate of software export to 10.84 and 7.31 percent in the years 2009-2010 and 2010-2011, respectively.

The Indian currency INR remained volatile throughout this period impacting the profitability of the software exporting companies, but the volatility increased from the financial year 2006-2007. There were always gaps in the growth of earnings in USD in INR, the gap widened during the financial years 2007-2008 and 2008-2009 when the Indian currency appreciated and depreciated, respectively by huge margins. This can be seen from the table. REER stands for the real effective exchange rate.

The Figure 1 depicts the growth of software exports both in USD dollar and Indian rupee from the financial year 2001-2002 to 2011-2012.

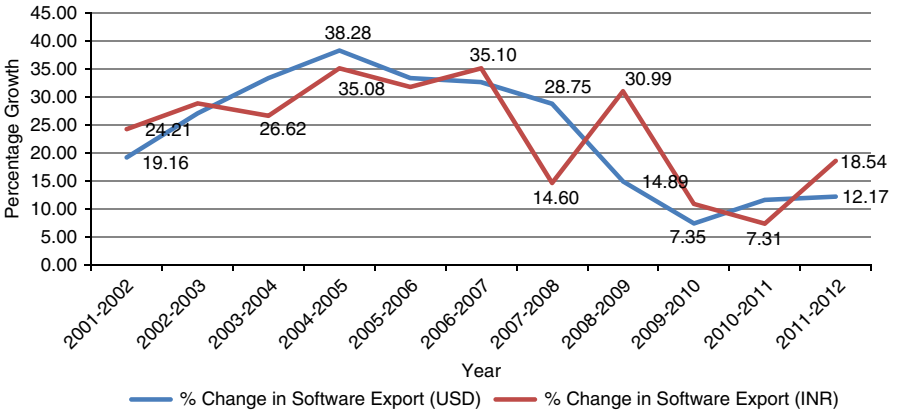


Figure 1.
Software export growth in USD and INR

Source: RBI

Software export growth moderated to 7.35 percent during 2009-2010 in the wake of global crisis from an annual growth rate of 38.28 percent during 2004-2005. The export growth in rupee term decreased in 2007-2008 to 14.60 percent due to appreciation in exchange rate (REER appreciated by 7.44 percent) but, the growth was at 28.75 percent in USD. In 2008-09 the reverse thing happened. REER depreciated by 9.95 percent causing the growth in rupee by 31 percent where the growth in USD was 14.89 percent.

2. Literature review

A study of published literatures from perspectives of flactuation of exchange rate and development of software industry in India throws some interesting viewpoints. Previous researchers' literatures have explored the relationships between the exchange rate flactuation and overall exports of India. The notable work in this context considered in this study are the works of Prakash and Sharma (2009), Veeramani (2008), Srinivasan and Wallack (2003). In the recent paper "Impact of exchange rate movements on exports: an analysis of indian non-financial sector firms (2012)" Cheung and Sengupta explored the relationship between exchange rate and variations and Non-Financial sector export.

This study attempts to explore more specifically the impact of rupee appriciation/depreciation on software services export. Here we are considering only aggregated export data and other macro-economic variables like REER and GDP growth rate.

Real Effective Exchange Rate (REER) is the weighted average of a country's currency relative to basket of other major currencies. It measures the competitiveness of the domestic currency against foreign currency, and reflects the health of the economy. All previous literatures used REER to measure the impact of the exchange rate on export (Table I).

If we look back in the past and try to look at the relationship between exchange rate and foreign trade of India, we found that during the era of planned development from 1950-1951 to 1989-1990 the exchange rate was an administered price. Foreign exchange transactions were heavily controlled, since the foreign exchange scarcity was one of the serious constraints to growth (Prakash and Sharma, 2009). Indian rupee started depreciating in 1991 and it continued till 2003. 1992, 1993 and 1999 recorded high degree of depreciation in the range of 13.2 to 37.49 percent. During 1990-2000, India switched over from import substitution to export-led growth. Export earnings both in rupees and dollars have grown at statistically significant annual compound rates of 7.84 and 3.93 percent (Prakash and Sharma, 2009). Many researchers have tested the Export-Led growth Hypothesis in case of India. Some significant works are by Ekanayake (1999), Sahni and Atri (2012). Both studies indicate that there is a strong

Year	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	SD
Change in REER	−0.08	−2.64	3.21	−0.78	2.74	−1.64	7.44	−9.95	−2.57	8.67	−2.74	5.21
Change in software export	19.16	27.05	33.33	38.28	33.33	32.63	28.75	14.89	7.35	11.58	12.17	10.77
Change in total export	4.79	17.51	25.18	29.17	25.91	24.95	29.41	13.26	−3.07	29.73	17.89	10.82

Note: Here decrease in percentage means depreciation and increase in the percentage means appreciation of the Indian rupee

Source: RBI

Table I. Year wise change in real effective exchange rate and exports

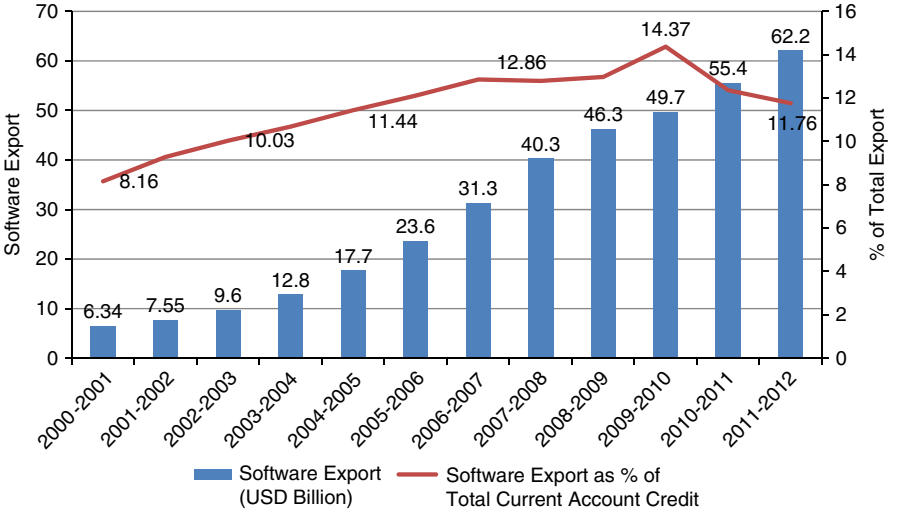
positive relation exists between export growth and economic growth and therefore there is need for export friendly policies. But for India export is not the primary growth driver like China (Sahni and Atri, 2012). If we look at the econometric methods, earlier studies used to find mainly the correlations among the variables and sometime wrongly denoted them as causality. But the Granger causality test which was incorporated in later researches used to provide correct causality relation among the variables (Ahmad, 2001). Innovation is also a major instrument to achieve and sustain long-term growth. Empirical evidences are found that innovation is crucial for economic growth (Guarini, 2009). The countries like Japan, Germany and other "Asian Tigers" which grew via export-led growth are high on innovation. Evidences in previous literatures show that exchange rate depreciation having a positive effect on exports, i.e. what macro-economic theories suggest. But starting from 1993-1994 onwards, the expected relationship seems to have been reversed (Cheung and Sengupta, 2012). We can see from the table that Indian rupee started appreciating from 2003 and then depreciated and appreciated in every alternate year till 2012. Earnings in dollars have registered higher growth than rupees, leaving exchange rate to contribute negatively to the growth of earnings in rupees (Prakash and Sharma, 2009).

Movement of Indian rupees with respect to USD is also closely followed by companies involved in foreign trade as it is the most traded currency in the world. In case of software services export it is more important as around 60 percent of India's total software export is to the USA (http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/4SCSIT101012.pdf).

The movement of USD-INR Exchange rate from the start of 2008 till April, 2012 shows 38 percent depreciation in the Indian rupee from 39 INR/USD to 54 INR/USD. By mid-October 2007, the Indian rupee had appreciated by 20 percent from Rs 49 a dollar in 2002 to Rs 39 a dollar. The rupee depreciated more than 20 percent in 2008 (Sing, 2009). Indian rupee not only depreciated against USD, it also depreciated against other major currencies like Euro and Yen. From the best performing asian currency in 2007, it became the worst performing asian currency in 2008 and 2011.

The empirical study done by Cheung and Sengupta (2012) suggests that the effect of the Exchange rate change on service exports is about 50 percent stronger than on goods exports. The foreign income effect is only observed for exports of goods – exports of services are not significantly influenced by income (Cheung and Sengupta, 2012). Software companies do gain from the depreciation of rupee as we have seen from the USD-INR earnings graph (Figure 1). On average, one percent depreciation in the rupee boosts the operating margins of the Indian information technology (IT) sector by 25-30 basis points. Some of these gains however, were offset by hedging. But apart from the rupee value software exports depend more on the quality and reputation (Sing, 2009). Share of software export in India's total current account credit, i.e. export increased steadily and reached maximum at 14.37 percent in 2009-2010 (Figure 2).

India is facing huge CAD in recent years, which hit a historic high of 6.7 percent in the December quarter of the fiscal 2012-2013. Whereas software export growth also increased substantially, total revenue of the industry stood at 7.5 percent of GDP in FY2012. This helped to contain CAD by bringing in revenue in foreign currencies. Realizing the sector as a major source of foreign exchange Indian government is felicitating software industry by various policy reforms and tax benefits. This sector is not only bringing foreign currencies but generating huge employment. According to NASSCOM this industry expected to add 230,000 jobs in FY2012, thus providing direct employment to about 2.8 million, and indirectly employing 8.9 million people.



Source: RBI

Figure 2.
Software export and as percentage of total current account credit

It has created a class of young people with high disposable income in the society. This section of the population is high on spending. Thus causing India's consumer spending to grow at a much faster rate, this in turn is contributing to the GDP growth of India creating a ripple effect. In the below section we will discuss some policy actions taken by Government of India over the years to promote software export from India.

3. Modeling frameworks

Reserve Bank of India (RBI) has published export and import data of "Software services" separately from the first quarter, i.e. April-June quarter of financial year 2000-2001. So, data from Q1 (April-June) of FY 2000-2001 to Q4 (January-March) of FY 2011-2012 is taken. It comprises of data for 48 consecutive quarters. We have taken the growth rate, so the final data set consist of data of 47 quarters. The main source to obtain data are "Handbook of Statistics on Indian Economy" published by RBI and it is also available on their website. Apart from this data are also collected from the website "www.tradingeconomics.com" and World Bank official website. The data collected for export of software services, merchandise export, REER, USD-INR exchange rate, GDP of India and selected countries. The impacts of the explanatory variables are observed on the response variables software and merchandise export. Possible explanation of the observed impact is also given in the later sections with the analysis of the obtained results.

3.1 Variable explanation

3.1.1 Response variables. 3.1.1.1 Software services export. Export revenue of software services from India. Aggregated quarterly export data are taken both in USD and Indian rupee. The variable "Change_Software_Export_INR" denotes the percentage change in the software export in INR from one quarter to the next and "Change_Software_Export_USD" denotes the percentage change in the software export in USD from one quarter to the next.

3.1.2 Explanatory variables. 3.1.2.1 Real effective exchange rate (REER). This is the weighted average of a country's currency relative to basket of other major currencies. The weights are determined by comparing the relative trade balances. RBI publishes monthly average REER data. From that quarterly average REER value is calculated and subsequently the percentage change is calculated.

3.1.2.2 External GDP Growth. The rationale behind taking this variable is that the macro-economic theory states that the export of a country is impacted by the foreign income level. If the foreign income increases then export will rise. As the foreign countries will grow they will outsource more IT services to Indian IT firms and the volume of IT services export will increase.

Weighted Average GDP growth of top four software exporting destinations – USA, UK, rest of European Union (excluding UK) and Japan is taken as a proxy for demand for software services from India. Above 90 percent of the total software export is done to those four regions. The reason behind taking weighted average growth is that the shares of software export to those destinations are not same. For example around 60 percent of the total software export from India is to the USA. So, growth or slow down in USA will impact software export more than the growth and slow down in Japan.

The weights are assigned as following.

USA – 60 percent, UK – 20 percent, rest of European Union (excluding UK) – 12 percent and Japan – 8 percent.

The weights are assigned by looking at the geographic distribution of export by Indian software firms (http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/4SCSIT101012.pdf).

3.1.2.3 GDP growth of India. To understand the macro-economic effect on the export this variable is taken. This represents the economic condition of India. Percentage change in GDP from one quarter to the next is taken.

4. Methodology

To find the relationship among response (dependent variable) and explanatory (independent variable) we have done the multiple regression analysis on the obtained time-series data. The research was totally based on the secondary data collected from reliable sources ("Handbook of Statistics on Indian Economy" published by RBI from 2000-2012). The simple linear regression technique is used to analysis the model:

$$X = f(REER/USD\_INR\_ER,\ External\_GDP,\ India\_GDP)$$

After specifying the export function in linear form with an addition of error term, we can write in following way:

$$\Delta X = \alpha + \beta 1(\Delta\, REER/\Delta\, USD\_INR\_ER) + \beta 2\, External\_GDP + \beta 3\, India\_GDP + \varepsilon$$

Where ΔX is the change exports volume of software services and merchandise. ΔREER is change in real effective exchange rate. ΔUSD_INR_ER is change in USD-INR exchange rate. External_GDP is the weighted average GDP growth of top four software exporting destinations. India_GDP is GDP growth of India in consecutive quarters. ε is the error term associated with the regression equation. Here both software and merchandise export are taken to make a comparative analysis between them.

This research is based on the following hypotheses that clearly defines the research criterion.

Hypothesis 1

H0. Real effective exchange rate has no significant impact on software services export.

H1. Real effective exchange rate has significant impact on software services export.

Hypothesis 2

H0. External GDP growth has no significant impact on software services export.

H1. External GDP growth has significant impact on software services export.

Hypothesis 3

H0. GDP growth of India has no significant impact on software services export.

H1. GDP growth of India has significant impact on software services export.

We will see the impacts for both export in INR and USD but our hypotheses are for export in USD.

5. Empirical results and analysis

The descriptive statistics of the response and explanatory variables is shown in Table II.

The correlation matrix is shown in Table III.

The correlation matrix shows that there is almost no correlation of software export in USD with exchange rate (−0.040) and GDP growth of India (0.181) and little positive correlation with the external growth (0.360).

	Change in merchandise export (USD)	Change in merchandise export (INR)	Change in software export (USD)	Change in software export (INR)	Change in USD-INR exchange rate	Change in REER	External GDP growth	India GDP growth
Max	32.15	29.38	33.28	34.50	7.12	5.34	5.20	5.80
Min	−23.95	−15.29	−13.78	−14.46	−10.22	−7.79	−6.24	−1.70
Mean	5.04	5.22	6.05	6.37	−0.23	0.01	1.17	1.75
SD	11.57	10.54	10.20	10.55	3.16	2.53	1.89	1.41

Table II. Summary statistics

	Software export in INR	Software export in USD	Merchandise export in INR	Merchandise export in USD
REER	−0.308	−0.040	0.087	0.296
USD-INR exchange rate	−0.243	0.086	0.186	0.437
External GDP	0.289	0.360	0.274	0.302
GDP of India	0.101	0.181	0.403	0.429

Table III. Correlation matrix

The empirical analysis involves various scenarios for modeling export of both software and merchandise in INR as well as in USD under different formulations:

(1) software export in INR with REER as exchange rate; and

(2) software export in USD with REER as exchange rate.

Multiple regression analysis is used for econometric analysis. The results are as follows:

(1) Software export in INR with REER as exchange rate.

The empirical result shows that REER and external GDP have impacts on software export in INR but GDP of India does not have any significant impact (5 percent significance level). But the low R^2 (0.230) value indicates that the impact is not hugely significant.

Change in REER has statistically significant negative impact ($p = 0.006$) on software export in rupee terms. That means when rupee appreciates the export declines as expected and vice-versa. In total, 1 percent appreciation in REER decreases the software export by 1.6 percent.

Change in external GDP has statistically significant positive impact ($p = 0.008$) on software export in INR. In total, 1 percent increases in external GDP increase the software export by 2.1 percent (Tables IV and V).

Regression equation[1]:

$$\text{Change\_Software\_Export\_INR} = 3.933 - 1.638\ \text{Change\_REER} + 2.107\ \text{External\_GDP}$$

(2) Software export in USD with REER as exchange rate.

Model summary

Model	R	R^2	Adjusted R^2	SE of the estimate	Change statistics R^2 change	Change statistics F change
1	0.308[a]	0.095	0.075	10.1516789	0.095	4.710
2	0.479[b]	0.230	0.195	9.4693674	0.135	7.719

Model summary[c]

Model	Change statistics df1	df2	Sig. F change	Durbin-Watson
1	1	45	0.035	
2	1	44	0.008	2.394

Table IV. Software export in INR with REER as exchange rate

Notes: [a]Predictors: (Constant), Change_REER; [b]predictors: (Constant), Change_REER, External_GDP; [c]dependent variable: Change_Software_Export_INR

Model	Unstandardized coefficients B	SE	Standardized coefficients β	t	Sig.
1 (Constant)	6.388	1.481		4.314	0.000
Change_REER	−1.285	0.592	−0.308	−2.170	0.035
2 (Constant)	3.933	1.640		2.399	0.021
Change_REER	−1.638	0.567	−0.393	−2.892	0.006
External_GDP	2.107	0.759	0.377	2.778	0.008

Table V. Coefficients

The empirical result shows that only external GDP ($p = 0.013$) has impact on software export in USD but REER and GDP of India do not have any significant impact (5 percent significance level). But the low R^2 (0.130) value indicates that the impact is very less significant.

Change in external GDP has statistically significant positive impact on software export in USD. In total, 1 percent increases in external GDP increase the software export by 1.94 percent (Tables VI and VII).

Regression equation (see footnote 1):

$$\text{Change\_Software\_Export\_USD} = 3.780 + 1.944\ \text{External\_GDP}$$

After Multiple regression analysis, Pairwise Granger Causality test, which is the most accepted test to find the cause-and-effect relationship, is also performed on the variables to find out the cause-effect relationship between the dependent variable and the independent variables. This test takes the pair of variables and checks for the possible cause-effect relationship between them (Table VIII).

Model summary

Model	R	R^2	Adjusted R^2	SE of the estimate	Change statistics R^2 change	Change statistics F change
1	0.360[a]	0.130	0.110	9.6167602	0.130	6.711

Model summary[b]

Model	Change statistics df1	df2	Sig. F change	Durbin-Watson
1	1	45	0.013	2.334

Notes: [a]Predictors: (Constant), External_GDP; [b]dependent variable: Change_Software_Export_USD

Table VI. Software export in USD with REER as exchange rate

Model	Unstandardized coefficients B	Unstandardized coefficients SE	Standardized coefficients β	t	Sig.
1 (Constant)	3.780	1.654		2.286	0.027
External_GDP	1.944	0.751	0.360	2.591	0.013

Table VII. Coefficients

Date: April 30, 2013; time: 12:14
Sample: 1 47
Lags: 2

Null hypothesis	Obs	F-statistic	Prob.
SOFEXPUSD does not Granger Cause EXRATE	45	1.20747	0.3096
EXRATE does not Granger Cause SOFEXPUSD		1.17255	0.3200
SOFEXPUSD does not Granger Cause EXTGDP	45	1.13832	0.3305
EXTGDP does not Granger Cause SOFEXPUSD		2.53009	0.0923
SOFEXPUSD does not Granger Cause GDPIND	45	0.27728	0.7593
GDPIND does not Granger Cause SOFEXPUSD		0.79703	0.4577
SOFEXPUSD does not Granger Cause REERCHANGE	45	1.45353	0.2458
REERCHANGE does not Granger Cause SOFEXPUSD		0.13154	0.8771

Table VIII. Pairwise Granger Causality tests

Here SOFEXPUSD is software export in USD, EXRATE is USD-INR exchange rate, REERCHANGE is change in REER, EXTGDP is external GDP growth, and GDPIND is the GDP growth of India.

From the significance value of the hypothesis testing we can conclude that none of the factors among REER, USD-INR exchange rate, external GDP growth and GDP growth of India can be regarded as a cause for software export of India. The significance value for external GDP is 0.0923, which is nearest to the significance value of 0.05.

6. Conclusion and recommendations

Software export is heavily dependent on the external demand. Slow down in USA and Europe impact most on software industry as the foreign clients cut down their IT budget and decision making on IT spending also got delayed. Change in REER is also having some impact as it increase or decrease the earnings of the IT companies. But most of the companies hedge against the forex risk as their earnings is heavily dependent on exports. So, in the process they made some forex gains and losses but their earnings remained stable and we have witnessed a strong growth in export of software services in the last decade. The macro effect used in this study is GDP growth of India. It does not affect the software export much as more than 90 percent of the revenue of the software industry comes from outside India. Political scenarios in exporting countries affect this sector much more that the political scenario in India. The IT sector is heavily influenced by the external demands which in turn are impacted by the political scenarios in exporting countries and policy decisions by those governments. Whenever there is any talk of curbing outsourcing in the USA the stock prices of Indian IT companies take a hit. This sector is driven by the human capital which consists of knowledge workers, mainly the engineers and management graduates. So, issues like land acquisition, trade union strike does not affect this sector.

It is quite predictable that fluctuations in exchange rate will impact the earnings of software companies. Because, it is not possible to predict the exchange rate perfectly and hedge against the forex risk. But our main objective is to validate the macro-economic theory that depreciation in domestic currency boosts export as it makes domestic good and services cheaper and appreciation in domestic currency deters export as it makes domestic good and services costlier. We are validating this theory for Indian rupee and keeping software services export in our focus. Our hypotheses established before will help us in validating the theory.

From the obtained results in multiple regression analysis, acceptance and rejection of the hypotheses will be like following:

(1) accept the null hypothesis that real effective exchange rate has no significant impact on software services export;

(2) accept the null hypothesis that USD-INR exchange rate has no significant impact on software services export;

(3) do not accept the null hypothesis that external GDP growth has no significant impact on software services export; and

(4) accept the null hypothesis that GDP growth of India has no significant impact on software services export.

The results obtained from multiple regression analysis are also supported by the results obtained from Granger Causality test. It doesn't identify anything as a major

cause of software export. Whereas though multiple regressions shows that the external GDP is having the statistically significant impact on the software export the low value of R^2 denotes that the impact is very low.

These results motivate us to further explore the drivers of software services export from India. Review of literatures show that software services export was totally different than merchandise export and driven by different factors.

Although India was among the first developing nations to recognize the importance of software, the key driver behind exporting software was foreign exchange (Pandey *et al.*, 2004). Unlike the offshore software outsourcing industries of Ireland and Israel, in which multinationals started the industry, in India, local conglomerates began the industry by sending programmers to clients' sites overseas (Dossani, 2006). This was known as "body shopping." India's export success is primarily driven by local enterprise, resources and talent. The role played by Multi National Enterprises in software development in India is quite limited (Kumar and Joseph, 2005).

Literatures also reveal that substantial difference in salaries of IT professionals is a major driver for the development of software industry in developing countries and particularly in India. The cost to a company for a software developer in India varied from USD 16,000 to USD24,000 annually whereas the corresponding charges of sending the same developer to the USA varied between USD32,000 and USD42,000 annually. Comparing this to the total cost of a US software developer (USD60,000 to 95,000 yearly) in 1980, the savings were clearly quite significant (Pandey *et al.*, 2004). The multinationals looked for the comparative advantages offered by different countries globally and outsource prudently different services to different countries (Prasad and Tata, 2006). The demand for software is increasing due to the change in the perception of the companies. They no longer view software as a mere enabler which helps to automate the manual processes rather it can change the whole dimension of the business and can bring incremental revenues (Alshawi *et al.*, 2003).

To conclude we can say that the phenomenal growth of software industry is the outcome of factors like low cost skilled work force and a very supportive government policies and initiatives. Those make the industry quite immune from macro-economic effects like exchange rate fluctuations, low external growth and overall growth of India. But we have seen that in recent years the growth has slowed down as demand is not picking up due to slow down in USA and Europe. So, to keep the growth story sustainable both the Indian Government and the software industry need to work together. The Government should look at the policy front like intellectual property protection, smooth land acquisitions, tax benefits, etc. It should also focus on development of skilled work force for the software industry by incentivising research in universities, starting advanced courses in colleges and universities, increasing industry and academic linkages. The software industry should innovate more and increase the value proposition, acquire necessary skills like project management from abroad and train their professionals and remain competitive globally. But apart from all the macro factors there are several firm level microeconomic factors involved which drives the software industry. So, in the recent time we can witness the differential growth of different software companies. The research can be extended further with the firm-specific data to look for the microeconomic factors or drivers of the software industry. That will have an implication not only on individual firms but also on the overall economy as well.

Note

1. All results are for significance level of 5 percent.

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