COMPUTER SOFTWARE INDUSTRY IN INDIA:
EMERGING TRENDS IN PRODUCTION, EMPLOYMENT AND EXPORTS

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Certificate

This dissertation entitled **Computer Software Industry in India: Emerging trends in production, Employment and Exports** submitted in partial fulfilment for the M.Phil degree of this university has not been previously submitted for any other degree of this or any other university and is my original work.

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To

My Parents and

Sisters – Guddu & Nanna

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Chapter One

Introduction

Information technology (IT) is diffusing rapidly into all industrial and service sectors and is now seen as one of the most crucial technologies affecting economic growth in developing countries. Developing countries, which fail to introduce new information technologies, will be left with obsolete uncompetitive production methods.

Within the overall set of technologies that make up IT, software is vital since other technologies cannot function without it. Software has also been forming a growing component of overall value within information technology.

The development of a local software industry can therefore lead to many positive externalities and is seen as a necessity for developing countries to be able to adapt software technology to suit their particular local needs[1].

Software production is also seen as the best entry point for developing countries into the IT production complex[2]. For example, compared with hardware production, software production has much lower entry barriers, being less capital intensive, more labour intensive with a lower rate of obsolescence and (at least for certain types of software) far fewer economies of scale. All these factors assist developing countries, and

[1] Narsimhan, R (1984).
[2] Heeks, R (1996).

software's labour intensity of production offers a clear opportunity for them compared with many other production processes.

Hence it is not surprising that the interest in both the production and use of software is becoming more and more intense in a developing country like India and the actual production is also increasing phenomenally. The superb growth of Indian software industry's exports since the very beginning is quite amazing as there is an argument that a strong domestic-oriented software industry is required before a country can move into exports, because this will form the base on which to build up software production skills and capabilities. The experience of the Indian industry appears to contradict this argument, and this allows conclusions to be drawn about the desirability and consequences of an export-oriented, as opposed to domestic-oriented, development path for software industries. This unique behaviour of Indian software industry makes it the obvious choice of study site.

Software production is also of interest not just because it is a relatively recent phenomenon but also because it has certain specific features. The technology especially is pervasive and functionally complex yet also intangible; modifiable after initial production to create a new product; and with a lacks of any clear distinction between production tools and final product. The production process is also highly skill intensive, while certain types of production rely on labour mobility and on a rapidly growing world market.

All this makes software unlike any other technology and the software industry unlike any other industry. This suggests that policy prescriptions, which hold good for other industries, may not apply in this case and that a specific study of software is required.

Before proceeding, some basic definition relating to software needs to be given.

The technology involved in computing is normally divided into hardware and software. Hardware is the mechanical, magnetic, electronic and electrical devices which make up a computer and its peripherals while software is the instructions, programs or suite of programs which are used to direct the operations of a computer or other hardware plus associated documentation. Software consists of a series of instructions which are often grouped together to make up a program.

The software produced can be divided into two basic categories – application and systems software. Applications software is a program designed to carryout specific tasks or applications. Systems software is a program, which controls the operation of the total computer system.

The companies, which produce software, will be referred to collectively as the 'software industry'. This term will be taken to include those companies or company divisions which earn the majority of their revenue from sales of software consultancy services or software packages. There will be little focus on the other sources of software such as in-house software development and production within end-user organisations because production (at least sale of software) has been much greater from the software 'industry' in the case chosen; because of the difficulty and expense of obtaining information on these other sources and analysing them.

The software industry has been analysed from 1991 onwards as obtaining comprehensive data of earlier period is difficult. The study has been done at two levels – firm and industry level.

In the industry level, apart from analysing the industry through various ratios like capital intensity (which is capital expense by labour) total factor productivity growth has also been calculated to give insight about the production, exports and employment in the industry as the topic suggests.

In the firm level analysis the study has been done by pooling the firm level cross-sectional and time series data to get an insight about production, exports and labour productivity.

Apart from productivity other aspects which employment entails such as average salary or total working hours etc. have been left due to the lack of firm level data on them.

Before analysing the industry it is necessary to describe the performance of the industry and the government policy in the past. In Chapter 2 this has been discussed. This chapter also contains survey of literature.

Chapter 3 contains the methodology and plan procedure of the analysis. The terms used in the analysis have also been described.

Chapter 4 has two sections in which the industry level analysis and firm level analyses of the software industry in India have been discussed separately.

Finally some conclusions based on the analysis and policy prescription are presented in Chapter 5. This chapter also contains the limitations of the study.

Chapter Two

Understanding Software Industry

The Indian computer software industry, which made a humble beginning during early 1960s, has grown in leaps and bounds since then. This has led the economic planners and technocrats to place high priority on the development of it, including making a separate ministry for the purpose. The forecasters are so optimistic that they expect exports to be US$50 billion and the industry to be of US$87 billion by 2008[1]. Whether sustaining a high growth profile for such a long period is possible only time can tell.

Behind this growth are many factors, which are often not heeded -the increasing use of computers in every sphere, from factories to offices to homes – practically in every sphere of activity in the economy and society at large. The share of services in global income rose from 53% to 63%[2] - signifying a change in the pattern of demand and this change had a positive effect in the Indian software industry as well.

It is beyond the purview of the present study to discuss each and every detail of its development (neither it is possible), nonetheless a brief description of the Indian software industry's historical background may well be in order.

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[1] Findings of NASSCOM McKinsey Study: Indian I.T. Strategies (1999).

[2] Economic Times; New Delhi, 19 November 1998.

2.1 A Brief History

Initially the software industry was closely linked with the hardware industry. In 1968, the US anti-trust policy forced IBM to stop bundling software with hardware, which gave birth to software industry as a separate industry[3]. Hence in India as well until the mid-1960s both the software and hardware were provided by multinational hardware companies. By 1970s the scenario changed – government and academic computer users relied partly on the imported software bundled with hardware, partly on their own software developers. However, with an increasing number of commercial organisations using computers, software development began to be contracted to outside organisations, such as management consultancies. A domestic market was thus created.

Around this time, the data processing departments of some large companies and the software groups of some Indian hardware manufacturers began trying to sell their in-house software. As they recognised the revenue-earning potential of software, some of these firms made their software units more outward-looking, sometimes hiving them off as a separate company within the overall business group.

As the domestic market was limited, the growth in the initial phase was slow and erratic. As exports began to grow after 1981, because of increasing availability of skills and external factors such as bigger market of the west, small and medium- sized domestic - oriented companies tried to break into exports. Simultaneously, in the aftermath of the 1984 hardware policy, thousands of personal computers came into the country and this led to the creation of a large number of software companies, especially small ones,

[3] Patibandla et.al (2000).

seeking to meet the service and product needs of the newly emerged network of computer owners.

From the late 1980s, there was a significant increase in local and multinational interest in exports alone with a number of large Indian firms spinning off software divisions. By mid-1990s even those firms which had initially focussed on hardware were pushing into software exports, compounding the export obsession. Hence it can be said, unlike other industries in the country, the growth of software industry has been fuelled by external demand.

Now multinational companies began to take a serious interest in India as a software development source and as a market for software products. They set up distribution agreements with local companies, contracted work out to Indian software houses and entered into equity participation agreements. The industry, which started out mainly as a techno-coolie service provider, began to mature into offshore services.

2.1.1 Government's role The Indian computer software industry was born owing to government spending on defence research and public sector undertakings. The first computer was introduced in India in 1956 for the use at the Indian Statistical Institute. Around the mid-1960s, the government of India started a policy towards localising production of computers, at that time no private entrepreneur could even see the potential of this industry in the country. Local entrepreneurs could not even think of competing with international giants such as IBM and ICL. During mid 1970s Department of Electronics (DoE) was created with a remit which included the software industry and software industry policy. It was also made clear that software was eligible for export incentives such as location of production in 'export processing zones' (EPZ's).

Since then the government has been supporting the industry through different measures, like giving tax concessions, lowering duties on exports and tariffs on imports used for the purpose. Many STPI's (Software Technology Parks of India) has been set up in different cities. Some scholars e.g. Sen do, however hold on opposite view.

> "*Until 1991-92 there was virtually no policy support at all for the software sector. Even a 'benign neglect' would be a too positive a phrase to use in this connection*". (Sen1995: M19)

But then even the association of software producers NASSCOM (National Association of Software and Service Companies) does not agree with Sen's view.

> "*.... in 1986, the Government of India announced the first computer software policy and since then software has always been identified as a thrust area*". (NASSCOM 1999: 16)

On balance, we are convinced that some policy initiative were put on ground before the Indian software industry threw itself completely open to world trade. This does not, however, mean that the scope for improvement did not exist or lacunae were not present in these government policies and initiative or in their implementation.

2.1.2 Overall production To correctly report the exact figures of production (or for that matter of any aspect) of this industry is difficult as there is dearth of availability of reliable and temporally comparable statistics on diverse aspects of software industry in India. Even when the data is available through some sources they are vastly different. Probably NASSCOM estimates are least inaccurate since we have reasons to believe that the association of the industry itself must be taking full pains to progressively update the information. Another source which can be relied upon is CMIE which presents statistics by aggregating the data taken from the balance-sheets of companies, to say the least CMIE data are more comprehensive in nature (hence we have relied heavily on CMIE data in our analysis).

The total industry according to NASSCOM has grown from Rs.1165 crores in 1992-93 to Rs.10040 crores in 1997-98- a cumulative annual growth of over 50% (see table 2.1).

Table 2.1 *Growth of Indian Software Industry (Rs. crores)*

Year	*Domestic Market*	*Exports*	*Total*
1992-93	490	675	1165
1993-94	695	1020	1715
1994-95	1070	1535	2605
1995-96	1670	2520	4190
1996-97	2410	3900	6310
1997-98	3510	6530	10040
Growth Rate	48.26	57.44	53.84

Source: A Strategic Review; NASSCOM (1999)

There has been a considerable bias towards exports though now even domestic market has also started picking up.

2.1.3 Exports The software industry in India has always been highly export oriented. The computer software exports have grown from Rs.675 crores in 1992-93 to Rs.6530 crores in 1997-98. A cumulative annual growth rate of 57.44% (see table 2.1). Despite this India's software exports formed less than 0.15% of the world's computer services and software exports market in 1994-95[4].

The USA accounts for 58% of our total exports and the US and Europe combined constituted nearly 80% of our total exports in 1997- 98 (see table 2.2).

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[4] Heeks, R.; 1996; pp. 75.

Table2.2 *Destination of Indian Software Exports*

Country/Region	*Percentage*
USA	58%
Australia &New Zealand	2%
Europe	21%
Japan	4%
South East Asia	6%
West Asia	2%
Rest of the World	7%

Source: A Strategic Review; NASSCOM (1999)

2.1.4 Employment There have been hopes since the beginning that the software industry would be an important source of employment[5]. One, because India had and still has abundant supply of skilled English speaking labour at low cost which gives us a clear cut advantage over the rest. Two, the size of the market has grown continuously and is still growing. Three, a large part of the market domestic as well as abroad is still untapped. According to NASSCOM, manpower in this sector has grown from 56000 in 1990 to 200,000 in 1998 a CAGR (cumulative annual growth rate) of 17.25%.

2.1.5 Nature of the Industry Till around 1995 the bulk of Indian software exports have been in the form of professional services. A detailed analysis indicates that majority of software exports are in the areas classified as 'projects' or 'professional services'. However, since then there has been a considerable shift towards offshore project development though the degree of onsite work is still very high – as much as 59% as on 1998 (see table 2.3).

[5] op. cit. pp. 92.

Table 2.3 *Break-up of Software Exports*

Types of Services	*Rs. Million*	*%age*
On-site Services	38527	59%
Offshore Services	21027	32.2%
Products & Packages	5746	8.8%
Total	65300	100%

Source: A Strategic Review; NASSCOM (1999)

The break up of software activity for both domestic market as well as exports demonstrate that 'products and packages' tops the list with a share of 52% in domestic market whereas 'professional services' command a share of almost 48.4% in the export market. But it is interesting to note that increasing projects are gaining strength and almost command 31.5% market share in exports and 28.6% in domestic market (see table 2.4).

Table 2.4 *Segment-wise break-up of software exports & domestic market*

Software Activity	*Domestic Software*		*Software Exports*	
	Rs. Million	*% of Total*	*Rs. Million*	*% of Total*
Projects	10039	28.6	20570	31.5
Professional Services	1440	4.1	31605	48.4
Products & Packages	18252	52	5745	8.8
Training	2140	6.1	980	1.5
Support & Maintenance	1123	3.2	1960	3
IT Enabled	2106	6	4440	6.8
Total	35100	100	65300	100

Source: A Strategic Review; NASSCOM (1999)

According to NASSCOM there are currently 626 companies in India, which are engaged in the business of software exports. There are also another 200 companies in this, but their combined revenue is not more than Rs.500 million. One astonishing fact about this industry is that though some companies have grown too fast and have become too big yet unlike other industries the market concentration is very low. According to

CMIE: EIS; Industry: Market Size and Shares, Aug. 1999, Herfindahl index[6] which was already very low has been continuously decreasing from 0.137 in 1992-93 to 0.040 in 1997-98, which indicates either there is high degree of competition among the firms or they are operating in totally different segments.

Now after knowing a bit about the industry we may well proceed to discuss the views and perspectives of different scholars in brief about various aspects of software industry.

2.2 Views & Perspectives

The amazing growth of Indian software industry has caught the attention of many economists. Hence a vast literature has come up over the last few years. Most of this literature has been more like an overview more so the earlier one among them.

Lakha (1990) has assessed the growth of the industry especially the exports, emphasising mainly on advantages and problems regarding human resource. He argues though the country has a comparative advantage in supply of skilled manpower but because of 'brain drain' or the emigration of computer personnel in search of better salary and work environment this advantage might well be lost in years to come due to the shortage of qualified personnel. He also stresses on the importance of R&D. According to him if Indian industry is to command serious attention in overseas market it will have to lift its R&D profile.

> "*Whilst currently India enjoys some comparative advantage, certain limitations could over time counteract the benefits derived by*

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[6] A measure of industrial market concentration H= $\sum_{i=1}^{n} s_i^2$; where, s_i = market share of i[th] firm. H will be close to 1 when there are few firms and close to 0 when the market is divided among many firms.

the industry... low labour cost together with the price advantage may be offset in the global market because of the high computer and marketing costs incurred by the Indian producer" (Lakhal990: 55).

Economic performance is intimately related to the process of technological change, including the acquisition, diffusion and creation of new technologies and that technological change does not follow directly or automatically from uncontrolled market competition but from the forms of industrial organisations and government practices which play various intermediary roles. Brunner (1995) adopts this very axiom to study the computer industry. He argues though in 1978 that the multinational were driven out --the technological lag between India and the west was in fact the lowest at that period and kept on increasing till 1982. He presents a conceptual model linking technology change and TFP (total factor productivity) growth.

Diffusion from source of technology and positive industrial policy change lead to avenues to technology opportunities which further leads to technological change in firms and industry and finally TFP growth occurs. He tries to show that the shift in international technology standard has actually led to the increase in lag after 1979 and the decrease after 1982 has been attributed to the shift in import policy and beginning of delicencing after 1982.

His findings are in the Indian computer industry the congruent movements of both the technology gap and the price performance ratio heralds a wave-like interrelation of non-price competition and technological change.

As we know logically, industries with high levels of technological opportunities and a medium level of concentration are more likely to exhibit a high level of technological change[7]. He points out in case of India during 1977-86 the industry concentration points to high levels of technological change.

Sen (1995) tries to econometrically analyse the software exports growth, which has been continuously accelerating. He suggests that if exports are to grow exponentially government will have to play a significant role in it, which he considers, was absent till 1991.

Probably the first most comprehensive compilation of facts, figures, government policies and analysis has been presented by Heeks (1996). He tries to figure out as to how the country moved from structuralism to liberation and which way did it affect the software industry. He also tried to analyse various factors affecting the industry giving details about both.

Patibandla, Kapur and Petersen (2000) try to reason out as to how the software industry became 'an island of competitiveness' in the country. The explanation, which they provide, is, since import substitution was not directed at it hence unlike other industries this industry never grew because of absence of international competition. It took birth as a by-product of general policy framework and the import substitution policy directed at the hardware industry. Further, supply side help, and open trade environment, and collaboration with multinationals allowed by the policy-makers also contributed their share to its growth.

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[7] There is a whole lot of debate over this issue; Microsoft which is a monopoly in software business as far as market share is concerned (representing high concentration) is not able to exercise its monopoly power and has always been eager to innovate to maintain its position because in software industry and especially in the high-end product market innovation is the name of the game. This is the argument of noted industrial economist Richard Schmalensee while arguing the case of Microsoft (web-site-www.economist.com/freeforall as on 4/7/00)

But this argue is not very convincing as import substitution could not have been directed at hardware industry as we depended heavily on developed work for hardware products and initially as we discussed earlier hardware and software were clubbed, it was only at the latter stage that the two were separated. The government never tried the policy of import substitution at hardware industry as well. In fact in the latter stage an export-promotion policy directed at software industry was pursued which resulted in giving concessions on export of hardware[8]. As far as the argument of collaboration with multinationals is concerned, this had hardly bred competitiveness in any industry. The Indian experience has been that- multinationals, whether subsidiary or a collaborating one, try to capture the domestic market and the foreign market is often captured by the parent company.

In the emerging knowledge-based global economy, the sustainable competitive advantage of nations will reside not in there possession of natural resources or cheap labour force, but in there ability to harness there countries' intellectual assets. As such, the knowledge revolution offers a unique chance to leapfrog entire stages of development. These are the views of Bajpai and Radjou (2000) while assessing the case of Tamil Nadu. They propose that in order to make such a leap Tamil Nadu needs to initiate a knowledge-led development policy; they further argue that the roadmap to raise the global competitiveness of Tamil Nadu's IT industry is through strengthening both the demand and the supply. Though there policy prescription is for a particular state but it is relevant for the whole country as well.

[8] Heeks, R.;1996 ;Pp. 54-71

A field survey article by Kumar (2000) in which he presents a deep insight of the nature, problems and prospects of the sample firms engaged in different segments concentrates mainly on employment issue. The survey is based on three hi-tech cities of the country i.e., Delhi, NOIDA and Hyderabad.

Singh and Nandini (1999) have tried to capture the effects of trade and technology on employment in Indian software industry. They have done industry as well as firm level analysis.

In industry level analysis they argue that the immediate effects of increase in trade and technology will be creation of more jobs. Then they argue because of this there will be more and more investment in human-capital (i.e., training) to increase supply of skilled labour in the industry. There will be creation of more jobs in other sectors, as other sectors will go hi-tech, due to the multiplier effect. Because of which other sectors will get neglected hence those sectors, which require other kind of skills (other than the software programming etc.) will be supplied with second grade labour to which they termed as expense effect.

In the firm level analysis they have used panel data of 22 firms from 1996-98 to capture the effect of trade and technology (for which they have used dummy of ISO certification) on salaries, employment and productivity.

There are many problems with their panel data analysis as they have done simple OLS regression and have not tried to capture either the effect of individual firms or the effect of time. Secondly the number of industries are also very less, as for making their panel balanced they ignored many companies whose data for some years in-between the analysed period might be missing. Even then as their analysis is probably the first extensive firm-level study of this industry hence requires special mention.

As we have seen in most of the works the industry has been analysed extensively and many conclusions have been drawn upon keeping only the trade (exports) angle in mind, but there are some crucial aspects viz., production and employment, of the industry has been down-played. Hence in our analysis we have tried to study the industry's three most important aspects – production, exports and employment and various factors such as capital and labour productivity etc. which affect them.

As the study has been conducted at two levels; macro-level perspective in which we discuss the industry and micro-level perspective in which we discuss the firms. The macro-level study is simple and is based upon the analysis of various ratios. The micro-level study has been conducted through pooling of cross-section and time-series data, the effect of individual and time has been taken into consideration and have tried to study production, exports and productivity and captured the effects of other factors on these three.

The detailed procedure of our analysis immediately follows after this chapter.

Chapter Three

Methodology and Estimation Techniques

There has been much change in the style of study of industrial economics over the past. It has moved from the large sample industry cross-section study of industrial profitability to the infusion of industrial economics with game theory which fundamentally and permanently altered the methodology, though, it has been more successful in raising the questions about the determinants of market performance than about providing answers to those equations; hence from mid – 1980s onwards, industrial economics has turned back to empirical research as an activity to further intellectual progress. A movement from cross-section data analysis to panel data analysis has also occurred during the process. Panel data – tracking a cross-section over-time – expand questions that empirical researcher can address.

Most of the empirical work in industrial economics has used industry as the fundamental unit of analysis. A substantial minority of work however, has been done with firm rather than industry data[1].

The analysis here entails only one industry i.e., computer software industry; hence the latter approach has been adopted. One good reason for the adoption of this approach is that if panel-data (or cross-section study, for that matter) consist of observations on

[1] Martin, Stephen (1993); pp. 532

many industries they are open to all criticism because different industries have different behaviour-conduct-performance; hence panel data study suits firm level analysis of single industry the most. As it is plausible to assume that structurally speaking, all firms of a given industry operate under more or less similar constraints and problems and would tend to reflect similar responses to changing price milieu and market swings.

3.1 Sample Description

For both the industry as well as firm-level analyses the main source of data is CMIE's prowess software. The industry-data is for the period of nine years i.e., from 1991-99. The firm study has been performed on an eight-year period i.e., 1992-1999.

Most of the industry data has been arrived at by aggregating the firm data of respective variables. This is justifiable as CMIE also presents the data of industry by aggregating the values of respective variables of sample companies (as it has done in CMIE, EIS[2], June 1999; Industry: Financial Aggregates and Ratios; which also have been used at some places for industry-level analysis); other sources which have been used for the purpose are NASSCOM; The Software Industry in India: A Strategic Review (1999), Heeks (1996) and different web-sites.

In firm-level study data of one-hundred one (101) different firms have been analysed; since the data was not available for all the firms for all the years included in the study, hence the total number of observations are only 398 (instead of 808). So this makes it very obvious that the panel used for the study happens to be an unbalanced one.

[2] Centre for Monitoring Indian Economy; Economic Intelligence Service

3.2 Variables Used and Constructed

All the variables (of industry as well as firms) were deflated to 1981-82 prices, using general wholesale price deflators given in 'Economic Survey 1999-2000' (page S-63). The industry data have been presented and studied in rupees crores (Rs. 10 million) and firm data in rupees lakhs (rupees hundred thousand). Though most of the variables are self-explanatory even then all the variables have been explained below.

(i) **Sales** Income generated from main business activity like sale of goods and services, fiscal benefits, trading income. It also includes internal transfers. In firm level as well as industry analysis this has been used to denote total revenue.

(ii) **Gross value added (GVA)** This is the sum of wages and salaries, profits before depreciation, interest and tax, base rent and other rent. Normally this means the value addition done by the firm on its final product. For industry level analysis the sum of PBDIT (NNRT)[3] and wages and salaries has been considered gross value added.

(iii) **Wages and Salaries** This is the sum of salaries and other benefits given to the workers including managers and directors. Here it has been considered as the total wage-bill (or total money spent) given to the workforce.

(iv) **Capital Expenditure** This is basically the amount of money spent to get machinery etc. (capital inputs). In CMIE data as this was not presented hence it has been calculated by subtracting 70% of wages from cost of production. This is so because CMIE takes cost of production as –

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[3] PBDIT : Profit before depreciation interest and tax.
NNRT: Income from non-recurring transactions net of non-recurring expenses. NNRT include profit/loss on sale of fixed assets, sale of investments, provisions written back, prior period income expenses, insurance claims etc.

Cost of production = total raw material expense-change in work in progress stock + energy + other operating expense + depreciation + (wages * 0.7)

where ever the data on cost of production was also not given capital expenditure was generated by the above formula.

(v) **Profits** In the analysis of industry PBDIT (NNRT) have been used, which includes net profit, tax, interest, depreciation, lease rent, extra-ordinary expenditure minus extra ordinary income.

(vi) **Exports** This is the total foreign exchange earnings. It includes earnings from export of goods on *fob* (free-on-board) value as well as foreign exchange earnings from services. As this industry happens to be a service industry hence earnings through *fob* are absent here. It has been represented as `*xport*' in firm-level analysis.

(vii) **Imports** This is the total foreign exchange spending. It includes the *c.i.f.* (cost, insurance, fright or charged in full) value of raw materials, stores etc. and import of capital goods. Other foreign exchange outgo on account of royalty, know how fees, dividends, interest etc. all form part of imports. In firm analysis it has been represented as `*mport*'.

(viii) **Research and Development** Normally only that part of money spent on in-house R & D should be taken under this head which in near future can increase either production or efficiency of products in the very same line of business activity. We do not however know either the break-up of money spent or the nature of in house R & D; hence, whole of the money spent under this head is assumed to perform the above given activity in near future. In this analysis the data of R & D in revenue account and capital account have been added to arrive at total R & D expenses, primarily because the break-up is not available.

(ix) **Age** By age we mean age of the firm as on 1999. This has been calculated by subtracting the incorporation year of the firm from 1999, and for those firms whose incorporation year was not given in the data source, the preceding year of when the data of that particular firm first appeared in the source has been taken as incorporation year.

(x) **Domestic market** This is revenue earned from selling the produce with-in the country. We arrive at it by subtracting exports from sales (as is done by NASSCOM). We refer this in our firm-level analysis as `domestic'.

(xi) **Labour Productivity** Singh and Nandini (1999) have taken out productivity by dividing revenue by the number of employees, which gives output (or revenue generated) per worker. We have arrived at it by dividing sales by wages which is not the same ratio as above, since this is return or output or revenue generated on per unit of money spent on workers. This being a knowledge based industry and as workers are not interchangeable, this measure suits the industry more. In firm level analysis this has been referred to as *'prod'* and the logarithmic value of it is referred to as *'logprod'*.

(xii) **Vertical Integration** This variable has been constructed by dividing gva by sales. This ratio represents the value addition done by the particular firm as a percent of sales. This ratio should be between 0 and 1. If value addition done by any company is very less in the product which it is selling then it will be close to 0, and will be close to one if whole of the product sold by the company is manufactured on its own (i.e. in-house).

As accounting is done on year to year basis and such value has to be calculated as on closing date, the value of this ratio can sometimes be more than one. This represents that the value addition done by the company in a particular accounting year was more than its sales, which is nothing but inventories, which can be taken care off in succeeding years. In the analysis this has been referred to as *`vertical'*.

Vertical integration is of two types – forward and backward. Forward if the company chooses to sell or distribute or market its own product; backward if it starts manufacturing the capital being used or intermediate goods being used on its own. In this industry a third type also exists which does not fall in any of the above two. Some firms making big softwares outsource some parts of those softwares to be made by other firms so vertical integration or increase in this ratio might result in this outsourcing to decrease.

(xiii) **Export intensity of imports** This ratio has been calculated by dividing exports by imports. This means export earnings per unit of imports. This ratio can increase if export promotion is exercised or import substitution is exercised or both i.e., it can grow in four ways (a) if exports increase faster than imports (b) if exports increase and imports remain constant (c) if exports increase and imports decline (d) if exports remain constant and imports fall. This has been referred to in the analysis as *`self'*.

Table 3.1 *VARIABLES USED & CONSTRUCTED*

VARIABLE	*FORMULA*	*NAME USED IN ANALYSIS**
Sales	Sales	Sales
Gross value added(gva)	Gva	Gva
Wages and salaries	Wages	Wages
Capital expenditure	capital expense	Capital
Profit	Profit before depreciation, interest and tax	PBDIT
Exports	Exports	Xport
Imports	Imports	Mport
Age of firm	1999-incorporation yr.	Age
Domestic market	sales-xport	Domestic
Labour productivity	sales/wages	Prod
Vertical integration	gva/sales	Vertical
Export intensity of imports	xport/mport	self

* *For logarithmic values 'log' has been used as a prefix to the variable name.*

3.3 Model Specification

The study has been done for all the years after 1990. The reasons for choosing this period are – one, prior to this period, the industry was too small and not much activity was occurring; two, dearth of availability of comprehensive data of earlier periods. As the study has been conducted at two levels (i) industry level, and (ii) firm level. The procedures adopted for each one may better be discussed separately. This follows as well.

3.3.1.a Industry level analysis In this broadly three main aspects have been looked into namely production, exports and employment.

(a) **Production** For portraying the production expansion the trends of revenue generation (total and within the country) and value addition have been analysed. Capital expenses wages etc. which directly affect the production process have also been studied. Then how these variables have performed vis-a vis each other have also been looked into, in terms of capital productivity, capital intensity, vertical integration, profit margin etc. Lastly, total factor productivity, which now a-days has become a standard yardstick for measuring technical progress have been calculated.

(b) **Exports** The export performance is analysed by studying its trend over the years. Then export intensity of imports has been captured to give an insight about the trade policy. Capital productivity, labour productivity, R&D intensity in terms of exports have also been discussed.

(c) **Employment** The employment scenario has been analysed through labour productivity, structure of employment and labour cost comparison with the rest of the world so as to give a better understanding of it.

3.3.1.b Estimation procedure In industry-level analysis most of the study has been performed by capturing the trends of the variables in absolute amount or in the form of ratios and hence they do not require any explanation.

Only the estimation procedure of TFP (total factor productivity) growth has been discussed. The TFP growth has been calculated in two ways – one, using the regression method which gives one value for the whole study period; and two, using the standard procedure which gives value for each year of the study period separately.

Let us assume a simple Cobb-Douglas production function, which has two, inputs viz., capital and labour.

$$Y = AK^{\alpha} L^{1-\alpha} \tag{3.1}$$

Where Y is output measured in terms of gross value added, K is capital measured in terms of capital expenditure and labour which is approximated or proxied by wage-bill. A is a constant, and α and $(1-\alpha)$ are output elasticity of capital and labour respectively.

As we know equation (3.1) is a case of CRS (constant returns to scale) which is an important part of the TFPG calculation exercise.

After differentiating, equation (3.1) becomes

$$\frac{\dot{Y}}{Y}=\frac{\dot{A}}{A}+\alpha\frac{\dot{K}}{K}+(1-\alpha)\frac{\dot{L}}{L} \tag{3.2}$$

$\dot{Y}$, $\dot{K}$ and $\dot{L}$ represent changes in output, capital and labour respectively.

Now we can easily calculated $\dot{Y}/Y$ and $\dot{L}/L$ on an year to year basis, a RLS regression is performed restricting the sum of coefficients equal to one, whereby getting the value of $\dot{A}/A$ which is TFP growth (Solow 1957 and Ahluwalia 1991).

In the second case; when we calculate TFP growth on year to year basis the coefficients are calculated by: P/Y (which is α or coefficient of K, where P/Y is profit divided by gross value added) and W/Y (which is β or coefficient of L, where W/Y is wages divided by gross value added) as P + W = Y the assumption of CRS holds. (Cornwall 1987).

TFP growth encompasses the effect not only of technical progress but also of better utilisation of capacities, learning by doing, improved skills of labour, etc. It is, therefore, a composite measure of technological change, and changes in the efficiency with which known technology is applied to production.

However it has many drawbacks all TFP growth indices are based on a methodology, which analyses equilibrium situations, the interpretation of these concepts in a disequilibrium situation becomes difficult. For instance, as capacity utilisation changes in the process of adjusting to short term changes in production environment, the effect is manifest in the form of variations.

3.3.2.a Firm-level analysis In this broadly three main aspects have been looked into namely production, exports and productivity.

(a) **Production** We hypothesise that with increasing use of capital, labour (proxied by wages), with increasing imports (which are mainly hardware and training and technical know-hows in this industry) and age of the firms; the production also increases. That is, all these have a positive impact on production. We have tested this hypothesis by capturing the effect of these variables (i.e., capital, wages imports and age) on sales, domestic market (revenue generated from within the country) and gross value added.

(b) **Exports** Here again we have tested the hypothesis that capital, wages, imports and age have a positive impact on exports.

Then we have tested the hypothesis that age of the firm and vertical integration have positive impact on export intensity of imports.

The reason for hypothesising this is, as the age increase the dependency on imports should decrease as technical knowledge and hardware are more or less one time investments; which will lead to increase in export intensity of imports (this is nothing but a ratio of exports by imports).

Now as vertical integration increases (i.e., an increase in the ratio of gva by sales) the dependency on imports should decrease hence an increase in export intensity of imports.

(c) **Productivity** Exports and age of the firm have positive impact on labour productivity. This hypothesis is proposed, as with increase in trade the labour efficiency should increase due the increased competition, on the other hand the positive effect of age is through the learning-by-doing process.

Then we have tested the hypothesis that vertical integration and export intensity of imports has positive impact on labour productivity.

This has been hypothesised, because with vertical integration more and more production becomes in-house hence it lowers down the cost which means that wage-bill in percentage terms should decrease. The increased export intensity of imports implies for more and more exports less and less of imports are needed. Here it is assumed that if this occurs then it is bound to increase productivity; for this is a sign of being globally competitive.

3.3.2.b Estimation procedure As mentioned earlier the period of analysis is eight years and we have cross-sectional firm level observations for 101 firms (though all firms do not figure throughout the analysed period). When observations are available for several individual units over a period of time the standard technique to analyse such a data involves some method of combining or pooling the time series and cross-sectional data. Since the data was not available for all the firms for all the years included in the study, this makes it very obvious that the panel used for the study happens to be an unbalanced one. We have tried to capture all the factors (production, exports & productivity) analysed through an standard panel-data equation

$$y_{it} = \alpha_{it} + \sum_{k=1}^{K} \beta_k x_{kit} + \varepsilon_{it} \tag{3.3}$$

Where y is a dependent variable and $x_1, x_2, \ldots, x_K$ are independent variables, i is the number of firms (in our case i = 1, 2, …, 101), t is the time (in our case t = 1, 2, …, 8 or 1992, 1993, …, 1999), and α, β, ∊ are intercept, coefficients and error terms respectively. The first step in the analysis is to run simply ordinary least square (OLS) regression on the pooled data. The equation estimated in the case takes the following form:

$$y_{it} = \alpha + \sum_{k=1}^{K} \beta_k x_{kit} + \varepsilon_{it} \tag{3.4}$$

However pooling of data adds a new dimension of difficulty to the problem of model specification, because the disturbance term is likely to consist time-series related disturbances, cross-section disturbances and a combination of both. There are two ways to get across the problem.

a) Fixed Effect (FE) The first technique involves the recognition that pooling may lead to changing cross-section and time series intercepts. The obvious generalisation is to introduce dummy variables that allow the intercept term to vary over individual (α_i) and over time (γ_t).

Here the equation to be estimated is:

$$y_{it} = \alpha_0 + \alpha_i D_i + \gamma_t D_t + \sum_{k=1}^{k} \beta_k x_{kit} + \varepsilon_{it} \tag{3.5}$$

In case pooling only leads intercept to vary cross-sectionally $\gamma_t D_t$ will be absent in equation 3.5.

There are some problems associated with the use of this model. First, the use of dummies does not directly identify what causes regression line to shift[4]. Second there is a substantial loss of degrees of freedom.[5]

b) **Random Effect (RE)**: The second technique involves the estimation procedure by accounting for cross-section and time series disturbances. We thus choose a pooled cross-section and time-series model in which error terms may be correlated across time and individual units. Hence the equation becomes:

$$y_{it} = \alpha + \sum_{k=1}^{k} \beta_k x_{kit} + v_{it} \tag{3.6}$$

$$where, v_{it} = \varepsilon_{it} + u_i + w_t;$$
$$u_i \sim N(0, \sigma_u^2) = cross-section\ error\ component;$$
$$w_t \sim N(0, \sigma_W^2) = time-series\ error\ component;$$
$$\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2) = combined\ error\ component.$$

In case pooling only leads to cross-sectional disturbance, in equation 3.6 v_{it} becomes:

$$v_{it} = \varepsilon_{it} + u_i$$

We assume also that individual error components are uncorrelated with each other and are not auto-correlated (across both time-series and cross section units).

The central issue associated with panel-data is one of efficiency. Though RE models are useful because they are estimated using GLS regression and are more efficient than the FE but it assumes u_i and w_t to be un-correlated with the

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[4] Greene (1997).
[5] Judge et.al. (1985).

regressors which seems rather unlikely. The choice between OLS and FE/RE is governed by Lagrange Multiplier test (which checks the behaviour of the disturbance term), and the choice between RE and FE is governed by the Hausman test.

Hausman Statistic: The essential result of Hausman test is that whether the covariance of an efficient estimator with its difference from an inefficient estimator is zero. It is distributed as chi-squared with k degrees of freedom.[6]

Precautions taken For all the analysis *heteroscedasticity* and *autocorrelation* problems were checked. The autocorrelation problem was not detected in any of the regressions. But wherever the heteroscedasticity problem was present it was removed using White/hetero. Corrected covariance matrix.

[6] Hausman and Taylor (1981).

Chapter Four

Findings and Data Analysis

As is clear from the previous chapter the analysis has been done in two steps one at industry-level two firm-level. Hence, the first section of this chapter discusses the results of industry level analysis and the second section presents the findings of firm-level study.

4.1 Industry Analysis

There can be no denying the fact that the industry has grown very fast since its very inception, particularly over the last decade. The sales have grown annually at a rate of 50.67% from 1991-99. During the same period gross value added and domestic sales[1] have grown at an annual rate of 58.5% and 46.5% respectively. There has been a steep rise in wages and capital expenses as well (61.2% and 52% respectively). Because of which the cost of production in the industry has also risen sharply i.e., 54.3%. As the other cost[2] has comparatively shown a moderate trend (which has grown at 40.7%) the trend of total cost has been rather lower than expected. The profits in the industry has also grown handsomely i.e., 56.86% CAGR.

[1] Revenue generated from within the boundaries of the country.
[2] Other cost entails marketing, distribution advertising, transportation costs etc.

Table 4.1 *Indian Software Industry's Financial Aggregates(in Rs.crores at 1981-82 prices)*

Year	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*Cumulative Annual Growth Rate(CAGR)%*
Sales	44.91	59.45	113.13	193.81	317.48	487.19	592.51	1017.55	1193.07	50.67
Domestic	20.88	24.46	58.76	91.60	162.92	262.05	306.61	492.56	443.18	46.51
Gross Value Added(GVA)	16.23	25.55	48.62	84.21	145.21	216.87	299.09	489.52	646.82	58.51
Wages	5.74	7.33	13.73	27.30	50.03	81.37	126.70	199.68	262.19	61.23
Capital Expense	15.52	18.77	36.38	74.27	123.36	212.77	211.25	428.13	443.41	52.05
Profit	10.49	18.22	34.89	56.91	95.18	135.51	172.39	289.84	384.63	56.86
R&D	0.00	0.55	1.01	4.38	4.47	3.92	5.90	6.49	4.20	33.75
Export	24.03	35.00	54.37	102.21	154.56	225.14	285.91	524.99	749.90	53.74
Import	17.43	19.32	32.87	59.04	87.50	143.06	172.19	284.15	376.17	46.81
Net Export	6.60	15.68	21.50	43.17	67.06	82.08	113.72	240.84	373.73	65.64
Total Cost	34.42	41.23	78.24	136.90	222.30	351.68	420.12	727.71	808.45	48.37
Cost of Production	19.54	23.90	46.00	93.37	158.38	269.73	299.94	567.91	626.94	54.28
Labour productivity	7.82	8.11	8.24	7.10	6.35	5.99	4.68	5.10	4.55	
Capital productivity	2.89	3.17	3.11	2.61	2.57	2.29	2.80	2.38	2.69	
R&D intensity	0.00	0.92	0.89	2.26	1.41	0.80	1.00	0.64	0.35	
Capital intensity	2.70	2.56	2.65	2.72	2.47	2.62	1.67	2.14	1.69	
*Labour productivity**	4.18	4.77	3.96	3.74	3.09	2.77	2.26	2.63	2.86	
*Capital productivity**	1.55	1.86	1.49	1.38	1.25	1.06	1.35	1.23	1.69	
Export Intensity of Import	1.38	1.81	1.65	1.73	1.77	1.57	1.66	1.85	1.99	
Export Intensity	0.54	0.59	0.48	0.53	0.49	0.46	0.48	0.52	0.63	
*R&D intensity**	0.00	1.57	1.85	4.28	2.89	1.74	2.06	1.24	0.56	
Profit margin	0.23	0.31	0.31	0.29	0.30	0.28	0.29	0.28	0.32	
Vertical integration	0.36	0.43	0.43	0.43	0.46	0.45	0.50	0.48	0.54	
*tfpg***	0.341	-0.017	-0.294	0.008	-0.197	0.175	-0.199	0.173		

Source: CMIE; PROWESS SOFTWARE & DATA BASE

* Values in terms of exports

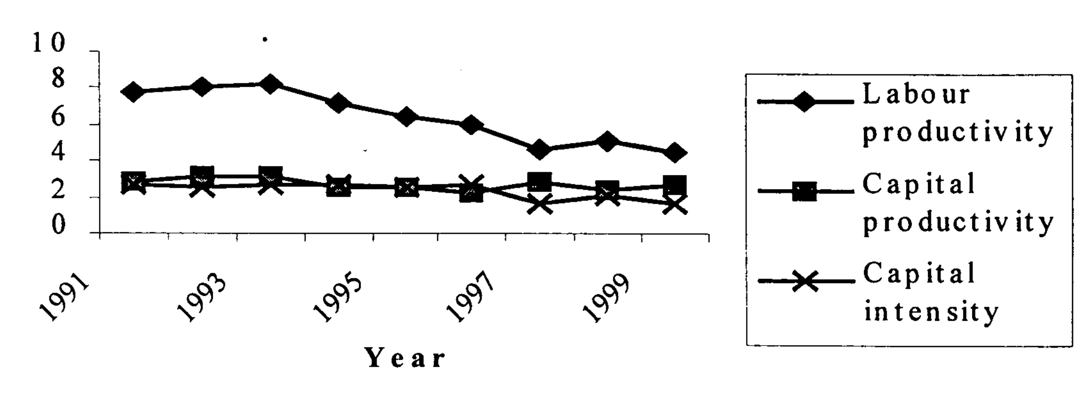
** Total Factor Productivity Growth

The exports have grown at 53.7% CAGR but net exports have grown even faster (65.6%), signifying decrease in imports. Also the annual growth rate of imports is only 46.8% which is lesser than the rate of increase of both sales as well as exports.

4.1.1 Productivity of Labour As has been mentioned in the preceding chapter we have arrived at it by dividing sales by wages. So, it is in fact return on per unit of money spent as wages. This ratio has reported a steep fall as the wage-bill has risen faster than the sales. The increase in the total wage-bill is due to two reasons (1) increase in the number of employees and (2) increase in the salaries paid to them. The number of employees according to NASSCOM[3] has risen at an annual rate of 17.25% between 1990 and 1998 (This has been calculated by the figures on number of employees given by the NASSCOM. The productivity of labour if calculated in terms of exports i.e., exports by wages, reveals more or less the same trend.

4.1.2 Productivity of Capital Capital productivity has remained more or less same till 1992 and has shown a decrease after that. If calculated in term of exports i.e., exports by capital or return or exports per unit of money spent on capital has also shown a decline after 1992 though it started rising after 1996 only to reach more or less at the same figure

Figure 4.1 Productivity and intensity trends



as that of 1992.

4.1.3 Capital Intensity The capital intensity as we know is capital by labour here we have taken wages. Hence it becomes money spent on capital as one unit of money goes as wages. The capital intensity has declined marginally. This means that there is a change in the combination of two inputs in the production process (provided the supply prices of both have remained the same or have increased or decreased at same rate).

4.1.4 Export Intensity The export intensity declined marginally after 1992 till 1996 after which it has been continuously improving.[4] The export intensity of imports which signifies exports earnings as one unit of expenditure is done on imports. This ratio has continuously been increasing after 1996. It means for exporting the product one needed less and less of imports which can be due to two reasons (a) if the company starts producing the commodities which it was earlier importing and (b) starts buying those commodities through the local market.

4.1.5 Vertical Integration This is arrived at by dividing gross value added by sales. This ratio has increased continuously, which means the value additions done by the industry as a ratio of sales has increased i.e., more and more of production has become in-house. Vertical integration normally leads to lowering down of costs, which has also occurred in this industry as well; we will see more of it under profit margin.

4.1.6 Profit Margin This ratio has been arrived at by dividing profits by sales; this is profits accruing as one unit of money is earned through sales. Though this ratio has remained constant from 1992 to 1998, it improved substantially in 1999. One minus the

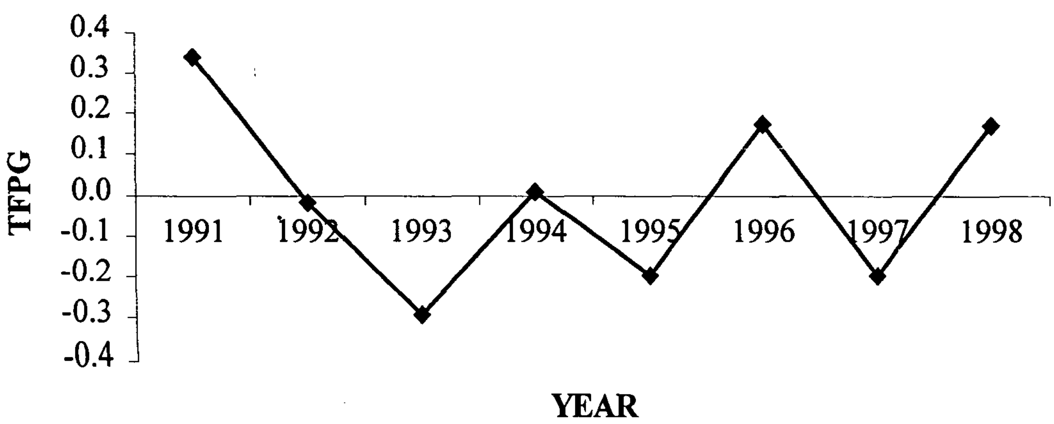
[4] This indicates that the industry is more export oriented and concentrates less in domestic market.

profit margin is the cost incurred per unit of sales. So this curve will behave just the opposite if cost is to be analysed.

4.1.7 R&D Intensity Research and development intensity is money spent on R&D per unit sales. This showed a steep rise from 1991 to 1994 after which the fall has been equally sharp. It has behaved the same way when calculated in terms of exports instead of sales.

4.1.8 Total Factor Productivity Growth Trends The total factor productivity which, as has been explained earlier, has been calculated for whole of the period through restricted

Figure 4.2 Total Factor Productivity Growth



least square. The TFP growth is positive when output is increasing faster than predicted by the growth of inputs. This, in a way, is to quantify technical change. Here the TFP growth calculated from 1991 to 1998 is coming around –0.0255[5] which means that the growth of inputs underestimate the output growth. We can say most of the output growth is appropriated by either of the inputs. This can occur if either the wage bill has been

[5] The t-ratio is –0.365 which is very small and signifies the insignificance of the coefficient. Even then it has been discussed as the annual TFP growth calculated also predicts somewhat the same results for the whole of the period.

rising too fast or supply price of capital is rising too fast or both. As we know from the data, the annual rate growth of GVA is less than that of wages but more than that of capital. Hence we can say that most of the growth is being appropriated by the labourers in form of wages. The trend of annual TFP growth can be well, be seen through the figure 4.2.

4.1.9 The Employment Scenario According to NASSCOM by 2000, the software industry in India may employ more than 280 000 – 300, 000[6] software professionals. Though such an increase is not surprising considering the software industry's unprecedented growth over the last nine years. But India's production of trained manpower is rather less, hence it will probably not able to able meet the demand of the industry which will further lead to rise in wages.

If we see the break-up of trained manpower the certificate and diploma holders combined form a large chunk. This denotes that the industry has a supply side constraint as well when it comes to shifting from low-end to high-end products.

If we study the cost breakdown of hiring Indian software labour we still have a tremendous comparative advantage over the rest at every level, see table 4.2. This in one way is good as we will continue to produce comparatively cheap software but this comparative advantage might just vanish if the multinationals or firms in other countries start employing Indian labour (which is happening as well). This will increase the cost of labour within the country leading to decrease in profits as well as domestic sales, (even if we consider the exports will not go down, as the gap is too wide).

[6] The Strategic Review; NASSCOM (1999).

Table 4.2 *Labour Cost Comparison (in,000 US$)*

	Switzerland	*US*	*Canada*	*UK*	*Ireland*	*Greece*	*India*
Project leader	74(3.2)	54(2.3)	39(1.6)	39(1.6)	43(1.9)	24(1.1)	23
Business analyst	74(3.5)	38(1.8)	36(1.7)	37(1.8)	36(1.7)	28(1.3)	21
Systems analyst	74(5.3)	48(3.4)	32(2.3)	34(2.4)	36(2.6)	15(1.1)	14
Systems designer	67(6.1)	55(5.0)	36(3.3)	34(3.1)	31(2.8)	15(1.4)	11
Development programmer	56(7.0)	41(5.1)	29(3.6)	29(3.6)	21(2.6)	13(1.6)	8
Support programmer	56(7.0)	37(4.6)	26(3.3)	25(3.1)	21(2.6)	15(1.9)	8
Network analyst/designer	67(4.8)	49(3.5)	32(2.3)	31(2.2)	26(1.9)	15(1.1)	14
Quality assurance specialist	71(5.1)	50(3.6)	28(2.0)	33(2.4)	29(2.1)	15(1.1)	14
Database data analyst	67(4.0)	50(2.9)	32(1.9)	22(1.3)	29(1.7)	24(1.4)	17
Metrics/process specialist	74(4.4)	48(2.8)	29(1.7)	31(1.8)	na	15(0.9)	17
Documentation/training staff	59(7.4)	36(4.5)	26(3.3)	21(2.6)	na	15(1.9)	8
Test engineer	59(7.4)	47(5.9)	25(3.1)	24(3.0)	na	13(1.6)	8

Note:figures are avg. for 1995,they are likely to rise c.5-10% per annum,with rates being slightly higher in lower-wage economies(figures in brackets are comparison w.r.t. India)
Source;Indian software labor:cost breakdown & comparison at http://www.man.ac.uk/idpm/isicost.htm as on 5/11/00

4.1.10 Analysis of Ratios The increase in exports and increasing export intensity of imports signify that the industry is more outward looking and depends heavily on foreign market for sale of their product. On the other hand, the measure of vertical integration is also rising which means less and less of outsourcing which has lead to decrease in imports as a percentage of sales i.e., imports by sales. This indicates that the dependence on the western world for input used and technical knowledge etc. (which largely constitutes the imports) have been decreasing sharply.

As we know the cost per unit sales is also going down. This proves our point that the vertical integration has helped the industry to lower its cost.

An interesting thing is that though as a percentage of sales the cost of production is rising the total cost has decreased which signifies that other cost per unit sales is going down so much so as to compensate the increase in cost of production and even more.

The trend that wage bill per unit sales is growing at a raster rate than GVA is of crucial importance for future growth of the industry. Profits per unit sales are growing largely due to decrease in other costs such as marketing, advertising, distribution, transportation costs etc. which, in turn is a result of grater vertical integration taking place. But this growth in profits sales ratio is not sustainable, as there are limi8ts below which these costs can't be reduced. This, coupled with the fact that profits can be reinvested, will affect future investments. This may well affect the future growth of the industry.

We have a comparative advantage over other countries as far as supply of cheap english speaking skilled labour is concerned but the decreasing labour and capital productivity might just erode this. This is an alarming trend as it will make our products costlier.

The decreasing R&D intensity and expenditure on R&D in absolute amount might be making an economic sense in the short run but if the industry wants to grow at an exponential rate this should grow as this will not only upgrade the existing software but also bring new products in the market. Which might further help our industry which right now concentrates only in low-end products (like data entry and offshore services) to shift for high-end products. Hence, the decreasing R&D intensity is probably not a good sign for the industry in years to come.

The decrease in the capital intensity is due to the nature of the industry. As this industry is knowledge based, the role of the labour is more than that of machines. So this trend might well continue even further.

Thus in total analysis we see in spite of high growth shown by the industry there are many aspects where serious thinking is required if we want to see this growth trend to continue.

4.2 Firm Analysis

In the first part of this section the results of different regressions which have been performed through the panel data analysis have been presented one after the other. Then in the second part those results have been discussed.

4.2.1 Findings As has been stated in previous chapter that all the analysis here has been done using standard panel-data equation (3.3). There are three different cases while analysing that equation.

Case 1: When intercept does not vary either with the individual or with the time. Hence the equation becomes,

$$y_{it} = \alpha + \sum_{k=1}^{K} \beta_k x_{kit} + \varepsilon_{it}$$

Case 2: When intercept varies with the individual[7] the equation becomes,

$$y_{it} = \alpha_i + \sum_{k=1}^{K} \beta_k x_{kit} + \varepsilon_{it}$$

Case 3: When intercept varies with individual and time[8] the equation in this case becomes

$$y_{it} = \alpha_{it} + \sum_{k=1}^{K} \beta_k x_{kit} + \varepsilon_{it}$$

Case 2 and Case 3 have been analysed using fixed effect and random effect.[9]

Almost for all the regressions, linear model has been used. However, in the analysis entailing labour productivity log linear or semi-log model has been used so as to scale down the values.[10]

4.2.1 (a) Here the effect of capital, wages, imports and age of the firm on sales have been presented, (table 4.3). In Case 1, we see that apart from imports all are significant (the t-ratio of import is 0.260). So we can say that apart from imports all the other variables positively affect the sales, i.e., with the increase of each of these the value of sales also increases.

In Case 2 (fixed effect) we see that imports and age are insignificant and wages and capital positively affect sales (in that order). This signifies that when firm-to firm

[7] Individual, group and firm are used interchangeably. Hence mean the same.
[8] Time and period has been used interchangeably. Hence mean the same.
[9] Random effect has been discussed only in the case when Hausman test has allows it.
[10] Gujarati (1995) pp.169-173.

difference is taken the effect of these two is much more. The value of F statistic[11] is very high (7.365).

Table 4.3 Sales equation estimates

OLS, No effects (Case 1), $R^2 = 0.964$, Adjusted $R^2 = 0.964$

$Sales_{it} = \alpha + \beta_1$ $Capital_{it} + \beta_2$ $Wages_{it} + \beta_3$ $Mport_{it} + \beta_4$ $Age_{it} + \varepsilon_i$

	α	β_1	β_2	β_3	β_4
Estimate	-32.039	1.385	2.112	0.037	6.898
t-ratio	-1.050	17.431	10.769	0.260	2.318

Fixed effects (Case 2), $R^2 = 0.989$, Adjusted $R^2 = 0.986$

$Sales_{it} = \alpha_0 + \alpha_i D_i + \beta_1$ $Capital_{it} + \beta_2$ $Wages_{it} + \beta_3$ $Mport_{it} + \beta_4$ $Age_{it} + \varepsilon_i$

	β_1	β_2	β_3	β_4
Estimate	1.341	2.062	-0.004	0.725
t-ratio	26.346	32.684	-0.064	0.089

Hausman =9.82, F[100,293]=7.365, LM Test = 798.17

Random effect (Case 2), $R^2 = 0.965$

$Sales_{it} = \alpha + \beta_1$ $Capital_{it} + \beta_2$ $Wages_{it} + \beta_3$ $Mport_{it} + \beta_4$ $Age_{it} + v_i$

	α	β_1	β_2	β_3	β_4
Estimate	-18.442	1.347	2.083	0.008	6.469
t-ratio	-0.423	54.730	39.898	0.212	1.706

Fixed Effect (Case 3), $R^2 = 0.99$, Adjusted $R^2 = 0.98$

$Sales_{it} = \alpha_0 + \alpha_i D_i + \gamma_t D_t + \beta_1$ $Capital_{it} + \beta_2$ $Wages_{it} + \beta_3$ $Mport_{it} + \beta_4$ $Age_{it} + \varepsilon_i$

	α_0	β_1	β_2	β_3	β_4
Estimate	52.75	1.33	2.03	0.00048	3.13
t-ratio	0.434	44.64	34.27	-0.011	0.268

Hausman =8.7, F[7,286]=0.559, LM Test=799.42

Random effect (Case 3), $R^2 = 0.965$

$Sales_{it} = \alpha + \beta_1$ $Capital_{it} + \beta_2$ $Wages_{it} + \beta_3$ $Mport_{it} + \beta_4$ $Age_{it} + v_{it}$

	α	β_1	β_2	β_3	β_4
Estimate	-9.299	1.35	2.08	0.0024	6.3
t-ratio	-0.160	52.08	38.12	0.060	1.4

[11] The F-test tests the difference across firms. It is calculated by the following formula:

F[n-1, nT-n-k] = $\dfrac{(R^2_{case2} - R^2_{case1})/(n-1)}{(1-R^2_{case2})/nT-n-k}$. T is total number of firms. As our panel is unbalanced hence in our case instead of nT it will be $\sum_{i-1}^{N} T_i$.

F_{tab} [100, 200] = 1.48 and F_{tab} [100, ∞] = 1.36 at 1% critical value. So we can easily say that the firm effects are not the same or each firm is significantly different from the other.

The Hausman test has rejected the RE study at 5% critical value.

In Case 3 (fixed effect): We see that again capital and wages affect sales rest are insignificant, To see whether the time has any effect we compare Case 3 with Case 2 with a similar F statistic its value is F[7, 286] = 0.559. The value is very low hence we can say that time as such has not made any difference. The Hausman test in this case rejects RE at 10% but accept at 5% hence we will discuss it though it is not very compelling.

In Case 3 (Random effect) here only capital and wages are significant and here again wages effect sales much more than capital.

4.2.1 (b) Here the effect of capital, wages, import and age on domestic has been presented (Table 4.4).

In Case 1 only capital and wages are significant and wages affect domestic more than capital.

In Case 2 (FE) Apart from capital and wages imports are also significant and negatively affect the domestic. The F-stat is again high signifying firms different effects. (That is every firm has different behaviour) Hausman test rejects the study of RE.

In Case 3 (FE) Those very variables i.e., capital wages and imports are significant and have similar effects on domestic as in Case 2. To see the effect of time F[7, 286] = 0.769 is seen. This predicts that time has not played a significant role.

Hausman test statistic has rejected the study of RE at 5% critical value.

Table 4.4 Domestic equation estimate

OLS no effect (Case 1), R^2 =0.897, Adjusted R^2 =0.895

Domestic$_{it}$ = $\alpha + \beta_1$ Capital$_{it}$ + β_2 Wages$_{it}$ + β_3 Mport$_{it}$ + β_4 Age$_{it}$ + ε_i

	α	β_1	β_2	β_3	β_4
Estimate	54.681	1.282	1.475	0.823	-0.305
t-ratio	1.073	21.504	4.154	0.145	-1.974

Fixed effects (Case 2), R^2 =0.971, Adjusted R^2 =0.960

Domestic$_{it}$ = $\alpha_0 + \alpha_i$ D$_i$+ β_1 Capital$_{it}$ + β_2 Wages$_{it}$ + β_3 Mport$_{it}$ + β_4 Age$_{it}$ + ε_i

	β_1	β_2	β_3	β_4
Estimate	1.100	1.302	-2.149	-0.312
t-ratio	23.289	11.687	-0.189	-4.644

Hausman =59.18, F[100,293]=7.489, LM Test =329.27

Random effect (Case 2), R^2 =0.897

Domestic$_{it}$ = $\alpha + \beta_1$ Capital$_{it}$ + β_2 Wages$_{it}$ + β_3 Mport$_{it}$ + β_4 Age$_{it}$ + v_i

	α	β_1	β_2	β_3	β_4
Estimate	106.40	1.137	1.388	1.352	-0.315
t-ratio	1.725	35.592	20.80	0.252	-6.449

Fixed Effect (Case 3), R^2 =0.971, Adjusted R^2 =0.960

Domestic$_{it}$ = $\alpha_0 + \alpha_i$ D$_i$+ γ_t D$_t$ + β_1 Capital$_{it}$ + β_2 Wages$_{it}$ + β_3 Mport$_{it}$ + β_4 Age$_{it}$ + ε_i

	α_0	β_1	β_2	β_3	β_4
Estimate	199.862	1.096	1.292	-2.744	-0.307
t-ratio	1.305	29.136	17.295	-0.187	-5.787

Hausman =10.14, F[7,286]=0.769, LM Test=329.51

Random effect (Case 3), R^2 =0.897

Domestic$_{it}$ = $\alpha + \beta_1$ Capital$_{it}$ + β_2 Wages$_{it}$ + β_3 Mport$_{it}$ + β_4 Age$_{it}$ + v_{it}

	α	β_1	β_2	β_3	β_4
Estimate	120.22	1.124	1.362	1.011	-0.315
t-ratio	1.406	33.238	19.625	0.143	-6.237

4.2.1 (c) The effect of capital wages import on GVA is presented below (Table 4.5).

In Case 1: The results are htesame as domestic. In Case 2 (FE) capital, wages and imports are significant. Here astonishingly imports also positively affect GVA apart from the other two. The F-stat value again predicts that firm have different effects.

Hausman test rejected at 10% but accepts at 5% critical value the study of RE hence we will present that.

Table 4.5 GVA equation estimate

OLS no effect (Case 1), R^2 =0.949, Adjusted R^2 =0.949

$GVA_{it} = \alpha + \beta_1 Capital_{it} + \beta_2 Wages_{it} + \beta_3 Mport_{it} + \beta_4 Age_{it} + \varepsilon_i$

	α	β_1	β_2	β_3	β_4
Estimate	-27.221	0.379	1.807	0.088	1.942
t-ratio	-1.218	5.546	12.519	0.742	1.187

Fixed effects (Case 2), R^2 =0.979, Adjusted R^2 =0.971

$GVA_{it} = \alpha_0 + \alpha_i D_i + \beta_1 Capital_{it} + \beta_2 Wages_{it} + \beta_3 Mport_{it} + \beta_4 Age_{it} + \varepsilon_i$

	β_1	β_2	β_3	β_4
Estimate	0.352	1.656	0.202	-0.445
t-ratio	9.199	30.282	4.097	-0.20

Hausman =9.12, F[100,293]=4.143, LM Test =346.98

Random effect (Case 2), R^2 =0.950

$GVA_{it} = \alpha + \beta_1 Capital_{it} + \beta_2 Wages_{it} + \beta_3 Mport_{it} + \beta_4 Age_{it} + v_i$

	α	β_1	β_2	β_3	β_4
Estimate	-28.447	0.358	1.704	0.163	2.434
t-ratio	-0.959	18.664	40.528	5.419	0.945

Fixed Effect (Case 3), R^2 =0.979, Adjusted R^2 =0.971

$GVA_{it} = \alpha_0 + \alpha_i D_i + \gamma_t D_t + \beta_1 Capital_{it} + \beta_2 Wages_{it} + \beta_3 Mport_{it} + \beta_4 Age_{it} + \varepsilon_i$

	α_0	β_1	β_2	β_3	β_4
Estimate	-16.650	0.365	1.673	0.981	0.192
t-ratio	-0.166	14.814	34.175	0.102	5.529

Hausman =5.88, F[7,286]=1.270, LM Test=348.24

Random effect (Case 3), R^2 =0.950

$GVA_{it} = \alpha + \beta_1 Capital_{it} + \beta_2 Wages_{it} + \beta_3 Mport_{it} + \beta_4 Age_{it} + v_{it}$

	α	β_1	β_2	β_3	β_4
Estimate	-20.723	0.357	1.689	2.045	0.175
t-ratio	-0.541	17.510	38.602	0.650	5.565

In Case 3 (FE) the results are the same as Case 2. The F-stat value predicts that time does not have much impact. Hausman test accepts the study of RE. In Case 2 (RE) wages capital and import positively affect GVA (intensity in descending order). In Case 3 (RE) the results are the same as Case 2 RE.

4.2.1 (d) The effect of those very variables on exports is presented below (Table 4.6).

Table 4.6 Export equation estimate

OLS no effect (Case 1), R^2=0.921, Adjusted R^2=0.920

$Xport_{it} = \alpha + \beta_1 \, Capital_{it} + \beta_2 \, Wages_{it} + \beta_3 \, Mport_{it} + \beta_4 \, Age_{it} + \varepsilon_i$

	α	β_1	β_2	β_3	β_4
Estimate	-86.720	0.103	0.636	6.076	1.343
t-ratio	-1.914	1.735	2.455	1.315	14.848

Fixed effects (Case 2), R^2=0.964, Adjusted R^2=0.952

$Xport_{it} = \alpha_0 + \alpha_i D_i + \beta_1 \, Capital_{it} + \beta_2 \, Wages_{it} + \beta_3 \, Mport_{it} + \beta_4 \, Age_{it} + \varepsilon_i$

	β_1	β_2	β_3	β_4
Estimate	0.241	0.759	2.874	1.308
t-ratio	4.077	6.503	0.209	16.22

Hausman =35.63, F[100,293]=3.605, LM Test =42.64

Random effect (Case 2), R^2=0.921

$Xport_{it} = \alpha + \beta_1 \, Capital_{it} + \beta_2 \, Wages_{it} + \beta_3 \, Mport_{it} + \beta_4 \, Age_{it} + v_i$

	α	β_1	β_2	β_3	β_4
Estimate	-119.168	0.196	0.671	5.272	1.325
t-ratio	-2.118	5.975	9.588	1.076	26.063

Fixed Effect (Case 3), R^2=0.965, Adjusted R^2=0.952

$Xport_{it} = \alpha_0 + \alpha_i D_i + \gamma_t D_t + \beta_1 \, Capital_{it} + \beta_2 \, Wages_{it} + \beta_3 \, Mport_{it} + \beta_4 \, Age_{it} + \varepsilon_i$

	α_0	β_1	β_2	β_3	β_4
Estimate	-147.104	0.238	0.743	5.875	1.306
t-ratio	-0.901	5.944	9.321	0.375	23.075

Hausman =3.78, F[7,286]=0.929, LM Test=43.04

Random effect (Case 3), R^2=0.921

$Xport_{it} = \alpha + \beta_1 \, Capital_{it} + \beta_2 \, Wages_{it} + \beta_3 \, Mport_{it} + \beta_4 \, Age_{it} + v_{it}$

	α	β_1	β_2	β_3	β_4
Estimate	-123.635	0.211	0.692	5.196	1.319
t-ratio	-1.688	6.082	9.547	0.836	24.991

In Case 1: only imports and wages are significant and affect xports positively. In Case 2 (FE) apart from age each variable affect xports positively. The F-stat predicts the firms have different effects. Hausman test rejects RE study.

Case 3 (FE) here again the results are the same as Case 2 (FE). F-stat predicts that time does not make much of difference. The Hausman test predicts for RE study. Case 3 (RE) apart from mports and constant term all else variables have significantly positive effect.

4.2.1 (e) The effect of age and vertical integration on self (export intensity of imports) is seen here (Table 4.7).

Table 4.7 Export intensity of import equation estimate

OLS no effect (Case 1), R^2 =0.002, Adjusted R^2 =-0.002

$\text{Self}_{it} = \alpha + \beta_1 \text{ Age}_{it} + \beta_2 \text{ Vertical}_{it} + \varepsilon_i$

	α	β_1	β_2
Estimate	3.802	-0.0505	0.485
t-ratio	2.368	-0.457	1.328

Fixed effects (Case 2), R^2 =0.812, Adjusted R^2 =0.747

$\text{Self}_{it} = \alpha_0 + \alpha_i \text{D}_i + \beta_1 \text{ Age}_{it} + \beta_2 \text{ Vertical}_{it} + \varepsilon_i$

		β_1	β_2
Estimate		1.2210	0.039
t-ratio		1.729	0.789

Hausman =8.70, F[100,295]=12.729, LM Test =0.62

Random effect (Case 2),

$\text{Self}_{it} = \alpha + \beta_1 \text{ Age}_{it} + \beta_2 \text{ Vertical}_{it} + \text{v}_i$

	α	β_1	β_2
Estimate	0.246	0.562	0.0583
t-ratio	0.072	2.157	0.172

Fixed Effect (Case 3), R^2 =0.817, Adjusted R^2 =0.747

$\text{Self}_{it} = \alpha_0 + \alpha_i \text{D}_i + \gamma_t \text{D}_t + \beta_1 \text{ Age}_{it} + \beta_2 \text{ Vertical}_{it} + \varepsilon_i$

	α_0	β_1	β_2
Estimate	-10.203	1.318	0.107
t-ratio	-2.771	3.731	0.315

Hausman =8.22, F[7,288]=1.235, LM Test=0.62

Random effect (Case 3),

$\text{Self}_{it} = \alpha + \beta_1 \text{ Age}_{it} + \beta_2 \text{ Vertical}_{it} + \text{v}_{it}$

	α	β_1	β_2
Estimate	-1.334	0.639	0.103
t-ratio	-0.370	2.440	0.306

In Case 1: Apart from constant none is significant, the R^2 is extremely low.

In Case 2 (FE) the R^2 is high significant; and age some what significant and has positive impact on export intensity of import. F-stat predicts that firms have different effects.

The Hausman rejects RE analysis.

In Case 3 (FE) the R^2 is high and age along with constant is significant. The F-stat predicts, the time does not have much impact. The Hausman test again favours only FE.

4.2.1 (f) In this the effect of export and age on labour productivity is presented (Table 4.8).

Table 4.8 Labour productivity equation estimate

OLS no effect (Case 1), R^2=0.085, Adjusted R^2=0.081

$\log(\text{Prod})_{it} = \alpha + \beta_1 \log(\text{Xport})_{it} + \beta_2 \log(\text{Age})_{it} + \varepsilon_i$

	α	β_1	β_2
Estimate	1.545	-0.139	0.410
t-ratio	6.766	-5.393	3.340

Fixed effects (Case 2), R^2=0.800, Adjusted R^2=0.732

$\log(\text{Prod})_{it} = \alpha_0 + \alpha_i D_i + \beta_1 \log(\text{Xport})_{it} + \beta_2 \log(\text{Age})_{it} + \varepsilon_i$

		β_1	β_2
Estimate		-0.0302	0.133
t-ratio		-0.850	0.519

Hausman =4.52, F[100,295]=10.596, LM Test =362.32

Random effect (Case 2), R^2= 0.85D-01

$\log(\text{Prod})_{it} = \alpha + \beta_1 \log(\text{Xport})_{it} + \beta_2 \log(\text{Age})_{it} + v_i$

	α	β_1	β_2
Estimate	1.354	-0.0652	0.376
t-ratio	3.640	-2.452	2.131

Fixed Effect (Case 3), R^2=0.803, Adjusted R^2=0.728

$\log(\text{Prod})_{it} = \alpha_0 + \alpha_i D_i + \gamma_t D_t + \beta_1 \log(\text{Xport})_{it} + \beta_2 \log(\text{Age})_{it} + \varepsilon_i$

	α_0	β_1	β_2
Estimate	1.898	-0.033	0.093
t-ratio	2.1	-0.928	0.225

Hausman =1.95, F[7,288]=0.602, LM Test=362.92

Random effect (Case 3), R^2= 0.85D-01

$\log(\text{Prod})_{it} = \alpha + \beta_1 \log(\text{Xport})_{it} + \beta_2 \log(\text{Age})_{it} + v_{it}$

	α	β_1	β_2
Estimate	1.382	-0.057	0.368
t-ratio	3.259	-2.024	1.873

In Case 1 the R squared is extremely low. In Case 2 (FE) though the R-squared is fairly high but the t-ratios are insignificant for both export as well as age.

F-stat predicts that the firm effect is significant. Hausman statistic fvours the RE.

In Case 3 (FE) apart from constant rest are insignificant. The F-stat predicts the time effect is nil. The low value of Hausman favour RE.

In Case 2 (RE) all the three including the constant are significant. Exports negatively (though extremely less) affect the productivity where as age positive by affects the productivity.

In Case 3 (RE) the results are more or less the same as Case 2 (RE).

4.2.1 (g) The effect of age, export intensity of import (self) and vertical integration on labour productivity is presented (Table 4.9).

Table 4.9 Labour productivity equation estimate

OLS no effect (Case 1), R^2 =0.009, Adjusted R^2 =0.001

log (Prod)$_{it}$ = $\alpha + \beta_1$ log (Age)$_{it}$ + β_2 Self$_{it}$ + β_3 Vertical$_{it}$ + ε_i

	α	β_1	β_2	β_3
Estimate	1.695	0.123	-0.0016	0.0838
t-ratio	7.453	1.214	-0.339	1.548

Fixed effects (Case 2), R^2 =0.819, Adjusted R^2 =0.756

log (Prod)$_{it}$ = $\alpha_0 + \alpha_i$ D$_i$+ β_1 log (Age)$_{it}$ + β_2 Self$_{it}$ + β_3 Vertical$_{it}$ + ε_i

	β_1	β_2	β_3
Estimate	0.275	-0.00839	0.167
t-ratio	0.988	-2.261	10.707

Hausman =4.34, F[100,294]=13.178, LM Test =439.21

Random effect (Case 2), R^2 =0.936D-02

log (Prod)$_{it}$ = α + β_1 log (Age)$_{it}$ + β_2 Self$_{it}$ + β_3 Vertical$_{it}$ + v_i

	α	β_1	β_2	β_3
Estimate	1.295	0.290	-0.00303	0.160
t-ratio	3.374	1.629	-0.793	5.197

Fixed Effect (Case 3), R^2 =0.822, Adjusted R^2 =0.753

log (Prod)$_{it}$ = $\alpha_0 + \alpha_i$ D$_i$+ γ_t D$_t$ + β_1 log (Age)$_{it}$ + β_2 Self$_{it}$ + β_3 Vertical$_{it}$ + ε_i

	α_0	β_1	β_2	β_3
Estimate	1.444	0.232	-0.0077	0.169
t-ratio	1.648	0.572	-1.409	5.338

Hausman =4.94, F[7,288]=0.603, LM Test=493.63

Random effect (Case 3), R^2 =0.936D-02

log (Prod)$_{it}$ = α + β_1 log (Age)$_{it}$ + β_2 Self$_{it}$ + β_3 Vertical$_{it}$ + v_{it}

	α	β_1	β_2	β_3
Estimate	1.413	0.251	-0.0029	0.16
t-ratio	3.311	1.307	-0.724	5.114

In Case 1: The R-squared is very low.

In Case 2 (FE) apart from age both export intensity of import and vertical integration are significant and vertical integration are significant and while vertical integration has a positive impart on productivity the export intensity of import has a negative (though extremely less) effect on productivity.

F-stat predicts that firms are significantly different. Hausman-statistic predicts RE.

In Case 3 (FE) vertical integration has positive impact on labour productivity.

F-stat predicts that time does not matter much. Hausman statistic predicts RE.

In Case 2 (FE) as well vertical integration has positive impact on labour productivity. In Case 3 (RE) the results are the same as Case 2 (RE).

4.2.2 Discussion

We begin by discussing the production; here the results show that with increase in wages and capital expenditure, value addition and revenue generation (total and within the boundaries of the country) also increase. The age does not play a significant role. This implies that prior information about the business is not as important. Which means that any company will not get the benefit just because it happens to be the earlier entrant into the business, this also means that prior information about the functioning of the industry and other nitty-gritty's which an entrepreneur is able to know only if he happens to be in the market for quite some time is not as important. Two interesting aspects which come to light through this analysis are that increase in imports leads to increase in GVA and a decrease in domestic revenue generation. Considering the fact that most of our imports are technical know-hows and hardware products the above two results are true as well as technical know-hows are more or less one time investments more so in this industry as once the technical knowledge about the software development or about working on different software packages or hardware is known to any one, the working on other packages and machines can easily be known, meaning there by, that the companies can easily get the return on money spent on the training of workers abroad in the form of increased value addition. The negative effect of imports on domestic revenue generation can be due to the fact that the local market demand is not for high-end software but for simple low-end ones, hence the increase in imports is in fact expenditure if viewed from the perspective of revenue generation with in the country.

One more insight can be gathered from the fact that vertical integration and age of the firm has led to increase in productivity, which is understandable as with vertical integration, the cost of production as well as other costs go down, hence the productivity in terms of money (as has been captured here) goes up. Now the second result that age of the firm positively affect the labour productivity (which here has been captured through sales by wages) has an obvious explanation— the workers become more efficient with the time as they are supposed to perform the same work over and over again or what we know in economics as learning by doing, which is all the more correct in case of Indian software industry which is engaged more in low-end product market.

The negative impact of exports on labour productivity is due to the nature of the Indian software industry, as most of our export-earning come from on-site work during which they get paid according to the international standard which leads to increase in the wages which further leads to decrease in labour productivity(as it is sales by wages).

Chapter Five

Conclusion

As we have seen that the Indian software industry has reported a phenomenal growth but the industry has its own set of problems as well and serious thinking is required in some areas lest the industry which has the potential to drive the economy in twenty first century starts decelerating.

The decreasing labour and capital productivity is a matter of grave concern. As with the decrease of these two, the production will become costlier. This will lead to loosing the cost advantage, which we currently enjoy over the rest of the countries.

As is well known that the Indian software industry mainly concentrates in low-end products such as data entry and onsite services, hence to move from linear to exponential growth will require production of high quality software, for which investing in R & D is a must. But the declining trend of investment in in-house R & D will certainly hamper the future plan of the industry.

The negative impact of trade (exports) on labour productivity requires this relation to be reversed without any decrease in the trade or exports. There should be considerable effort to shift from on site services to offshore work as the cost incurred on labour is much lower in the case of offshore services. Hence if this is done then without reducing the exports the labour productivity can be increased which will further lead to decrease in cost of production.

The firm level study gives us many insight about the behaviour and conduct of the industry. First is that the wages are the most important factor which governs the industry which means that the industry is highly skilled labour intensive. Second, imports positively affect the value addition, which means that better machinery or computer components and the improved skills on which a substantial amount of foreign exchange is spent is reaping good dividends in form of higher value addition in the industry.

The increasing vertical integration and the resulting decrease in cost of production has certainly boosted the industry growth prospects. The increasing profit margin can also yield positive results provided the profits are reinvested in the industry.

As our main idea is not only to continue with the current growth profile but to shift to higher growth path hence the policy prescription for the purpose in brief is discussed below.

Ideally, one would recommend a much greater emphasis on the domestic market. However this is unrealistic in the Indian context for two main reasons. First, because there has been so much investment and development with exports in mind – of institutional forms, collaborations, reputations, and of marketing, software development and bureaucratic capabilities. The retaining and other changes necessary to reorient the industry would be very costly. Second, and more importantly, because the political economy that has developed around software and which governs policy is very much in favour of exports and would not permit such a change in focus.

Realistic policy recommendations can therefore only seek to build up the domestic market rather than to restrain exports, and to look for the balance between the two models rather than to instigate a bias against exports, and in exports offshore services should be given higher priority, so that domestic use of software is able to develop in much way. The overriding recommendations for the Indian software policy to emerge from this study is that the industry be developed in future by striving for greater balance and integration between production for exports and for the domestic market.

The government, which has played an active role in the growth process of the industry until now, can further continue doing the same through policies and indicative planning.

Reductions in beaureucratic procedure have been acceptable to India's over worked beaureucracy and have almost always been benefit to the software industry. These should be encouraged to continue.

This will be achieved through government intervention and not through liberalisation. It will also be achieved by ensuring that domestic market production is not disadvantaged at the expense of biases to exports. This will involve an explicit recognition within policy of domestic oriented production and action to address domestic market constraints including an expansion of market size through government procurement and firm action on piracy; an encouragement of local R&D; substitution for other multinational inputs.

On the whole it can be said that the Indian software industry will have to change its stance and instead of surviving because of labour cost competitive advantage it will have to shift towards high technology products (i.e. to move in for the production of high-end products and offshore services) and will have to tap other upcoming related areas such as IT-Enabled services etc if it wants to continue with the current growth profile.

This analysis has many shortcomings, as in the firm level analysis random coefficient model was not tried due to the lack of data. The special question how these three factors namely production, employment and exports affect each other could have been looked into in a much better way, had the analysis been more rigorous but limited time and lack of data prevented us from doing that. We leave that for subsequent research when better data becomes available.

Data Appendix 1: Restricted least square regression for TFPG

REGRESS;Lhs=GVA;Rhs=ONE,WAGE,CAP;rls:b(1)+b(2)=1

```
+-----------------------------------------------------------------------+
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = GVA      Mean=  -124.3196960    , S.D.=   353.4242499     |
| Model size: Observations =          8, Parameters =  3, Deg.Fr.=     5 |
| Residuals:  Sum of squares= .1914727797    , Std.Dev.=         .19569 |
| Fit:        R-squared= 1.000000, Adjusted R-squared =        1.00000 |
| Model test: F[  2,       5] =********,    Prob value =         .00000 |
| Diagnostic: Log-L =       3.5783, Restricted(b=0) Log-L =    -57.7587 |
|             LogAmemiyaPrCrt.=   -2.944, Akaike Info. Crt.=      -.145 |
| Autocorrel: Durbin-Watson Statistic =  1.11415,   Rho =        .44292 |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant -.3784231327E-01  .74084522E-01    -.511   .6312
 WAGE      .8313433374      .25932915        3.206   .0238 -124.28372
 CAP       .1686185862      .25933408         .650   .5443 -124.30069
+-----------------------------------------------------------------------+
| Linearly restricted regression                                        |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = GVA      Mean=  -124.3196960    , S.D.=   353.4242499     |
| Model size: Observations =          8, Parameters =  2, Deg.Fr.=     6 |
| Residuals:  Sum of squares= .2147523429    , Std.Dev.=         .18919 |
| Fit:        R-squared= 1.000000, Adjusted R-squared =        1.00000 |
|             (Note:  Not using OLS.  R-squared is not bounded in [0,1] |
| Model test: F[  1,       6] =********,    Prob value =         .00000 |
| Diagnostic: Log-L =       3.1193, Restricted(b=0) Log-L =    -57.7587 |
|             LogAmemiyaPrCrt.=   -3.107, Akaike Info. Crt.=      -.280 |
| Note, when restrictions are imposed, R-squared can be less than zero. |
| F[  1,       5] for the restrictions =       .6079, Prob =   .4709    |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant -.2550434303E-01  .69970023E-01    -.365   .7304
 WAGE     1.025504343       .69970023E-01   14.656   .0000 -124.28372
 CAP      -.2553002350E-01  .70039960E-01    -.365   .7304 -124.30069
```

Data Appendix 2: Panel data regression results

Lhs=SALES;Rhs=ONE,CAPITAL,WAGES,MPORT,AGE

```
+-----------------------------------------------------------------------+
| OLS Without Group Dummy Variables                                     |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = SALES     Mean=    998.5439417     , S.D.=   2036.470551  |
| Model size: Observations =       398, Parameters =   5, Deg.Fr.=  393 |
| Residuals:  Sum of squares= 58297498.77       , Std.Dev.=   385.14892 |
| Fit:        R-squared= .964592, Adjusted R-squared =           .96423 |
| Model test: F[  4,     393] = 2676.54,     Prob value =         .00000 |
| Diagnostic: Log-L =  -2931.7665, Restricted(b=0) Log-L =   -3596.5884 |
|             LogAmemiyaPrCrt.=   11.920, Akaike Info. Crt.=     14.758 |
| Autocorrel: Durbin-Watson Statistic =   2.04443,    Rho =     -.02221 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =   882.4303, with   4 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant -32.03939805     30.520632        -1.050   .2945
 CAPITAL   1.385828186     .79505618E-01    17.431   .0000   389.93770
 WAGES     2.111805819     .19609354        10.769   .0000   193.06197
 MPORT     .3748115543E-01 .14405832          .260   .7949   294.92200
 AGE       6.898919718     2.9761327         2.318   .0210   10.354271
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = SALES     Mean=    998.5439417     , S.D.=   2036.470551  |
| Model size: Observations =       398, Parameters = 105, Deg.Fr.=  293 |
| Residuals:  Sum of squares= 16591797.88       , Std.Dev.=   237.96491 |
| Fit:        R-squared=  .989923, Adjusted R-squared =          .98635 |
| Model test: F[104,     293] =  276.75,     Prob value =         .00000 |
| Diagnostic: Log-L =  -2681.6930, Restricted(b=0) Log-L =   -3596.5884 |
|             LogAmemiyaPrCrt.=   11.178, Akaike Info. Crt.=     14.003 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL   1.341554555     .50921002E-01    26.346   .0000   389.93770
 WAGES     2.062029148     .63089106E-01    32.684   .0000   193.06197
 MPORT    -.3937621584E-02 .61892311E-01     -.064   .9493   294.92200
 AGE       .7257358427     8.1977228          .089   .9295   10.354271
+------------------------------------------------------------------------+
|                  Test Statistics for the Classical Model               |
|                                                                        |
|         Model              Log-Likelihood    Sum of Squares    R-squared |
| (1)   Constant term only    -3596.58835   .1646443285D+10     .0000000  |
| (2)   Group effects only    -3411.16659   .6484630570D+09     .6061431  |
| (3)   X - variables only    -2931.76647   .5829749877D+08     .9645919  |
| (4)   X and group effects   -2681.69297   .1659179788D+08     .9899226  |
|                                                                        |
|                              Hypothesis Tests                          |
|                Likelihood Ratio Test                 F Tests            |
|           Chi-squared   d.f.   Prob.          F    num. denom. Prob value |
| (2) vs (1)    370.844    100     .00000     4.571  100    297      .00000 |
| (3) vs (1)   1329.644      4     .00000  2676.535    4    393      .00000 |
| (4) vs (1)   1829.791    104     .00000   276.751  104    293      .00000 |
| (4) vs (2)   1458.947      4     .00000  2789.605    4    293      .00000 |
| (4) vs (3)    500.147    100     .00000     7.365  100    293      .00000 |
+------------------------------------------------------------------------+
```

Random Effects Model: v(i,t) = e(i,t) + u(i)
Estimates: Var[e] = .566273D+05
Var[u] = .467597D+05
Corr[v(i,t),v(i,s)] = .452278
Lagrange Multiplier Test vs. Model (3) = 798.17
(1 df, prob value = .000000)
(High values of LM favor FEM/REM over CR model.)
Fixed vs. Random Effects (Hausman) = 9.82
(4 df, prob value = .043547)
(High (low) values of H favor FEM (REM).)
Reestimated using GLS coefficients:
Estimates: Var[e] = .569869D+05
Var[u] = .504423D+05
Sum of Squares .600562D+08
R-squared .964592D+00

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
CAPITAL	1.347883884	.24628089E-01	54.730	.0000	389.93770
WAGES	2.083472672	.52219852E-01	39.898	.0000	193.06197
MPORT	.8068859689E-02	.38019486E-01	.212	.8319	294.92200
AGE	6.469528524	3.7926868	1.706	.0880	10.354271
Constant	-18.44214752	43.548558	-.423	.6719	

Least Squares with Group Dummy Variables and Period Effects
Ordinary least squares regression Weighting variable = none
Dep. var. = SALES Mean= 998.5439417 , S.D.= 2036.470551
Model size: Observations = 398, Parameters = 113, Deg.Fr.= 285
Residuals: Sum of squares= 16310635.83 , Std.Dev.= 239.22855
Fit: R-squared= .990059, Adjusted R-squared = .98615
Model test: F[112, 285] = 253.42, Prob value = .00000
Diagnostic: Log-L = -2678.2919, Restricted(b=0) Log-L = -3596.5884
LogAmemiyaPrCrt.= 11.205, Akaike Info. Crt.= 14.027
Estd. Autocorrelation of e(i,t) .000000

Variable	Coefficient	Standard Error	t-ratio	P[|T|>t]	Mean of X
CAPITAL	1.334580736	.29890668E-01	44.649	.0000	389.93770
WAGES	2.036152512	.59398583E-01	34.279	.0000	193.06197
MPORT	-.4813436407E-03	.42184829E-01	-.011	.9909	294.92200
AGE	3.131170391	11.674425	.268	.7887	10.354271
Constant	52.75796596	121.64598	.434	.6647	

Test Statistics for the Classical Model

	Model	Log-Likelihood	Sum of Squares	R-squared
(1)	Constant term only	-3596.58835	.1646443285D+10	.0000000
(2)	Group effects only	-3411.16659	.6484630570D+09	.6061431
(3)	X - variables only	-2931.76647	.5829749877D+08	.9645919
(4)	X and group effects	-2681.69297	.1659179788D+08	.9899226
(5)	X ind.&time effects	-2678.98887	.1636786613D+08	.9900587

Hypothesis Tests

	Likelihood Ratio Test			F Tests			
	Chi-squared	d.f.	Prob.	F	num.	denom.	Prob value
(2) vs (1)	370.844	100	.00000	4.571	100	297	.00000
(3) vs (1)	1329.644	4	.00000	2676.535	4	393	.00000
(4) vs (1)	1829.791	104	.00000	276.751	104	293	.00000
(4) vs (2)	1458.947	4	.00000	2789.605	4	293	.00000
(4) vs (3)	500.147	100	.00000	7.365	100	293	.00000
(5) vs (4)	5.408	7	.61028	.559	7	286	.78893
(5) vs (3)	505.555	108	.00000	6.784	108	286	.00000

```
+--------------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)          |
| Estimates:  Var[e]              =   .572303D+05              |
|             Var[u]              =   .684275D+05              |
|             Corr[v(i,t),v(i,s)] =   .544554                  |
|             Var[w]              =   .379481D+04              |
|             Corr[v(i,t),v(j,t)] =   .062184                  |
| Lagrange Multiplier Test vs. Model (3) =  799.42             |
| ( 2 df, prob value =  .000000)                               |
| (High values of LM favor FEM/REM over CR model.)             |
| Fixed vs. Random Effects (Hausman)    =    8.70              |
| ( 4 df, prob value =  .068963)                               |
| (High (low) values of H favor FEM (REM).)                    |
| Reestimated using GLS coefficients:                          |
| Estimates:  Var[e]              =   .592142D+05              |
|             Var[u]              =   .501356D+05              |
|             Var[w]              =   .105988D+05              |
|             Sum of Squares          .601845D+08              |
|             R-squared               .964592D+00              |
+--------------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
CAPITAL	1.349560373	.25915300E-01	52.076	.0000	389.93770
WAGES	2.081357454	.54599579E-01	38.120	.0000	193.06197
MPORT	.2360824101E-02	.39175625E-01	.060	.9519	294.92200
AGE	6.309067707	4.5197760	1.396	.1628	10.354271
Constant	-9.298533712	58.153139	-.160	.8730	

Lhs=GVA;Rhs=ONE,CAPITAL,WAGES,AGE,MPORT

```
+-----------------------------------------------------------------------+
| OLS Without Group Dummy Variables                                     |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = GVA      Mean=   515.7693387    , S.D.=   1177.746515     |
| Model size: Observations =      398, Parameters =   5, Deg.Fr.=   393 |
| Residuals:  Sum of squares= 27701658.95     , Std.Dev.=     265.49516 |
| Fit:        R-squared= .949695, Adjusted R-squared =          .94918 |
| Model test: F[  4,    393] = 1854.83,    Prob value =          .00000 |
| Diagnostic: Log-L =  -2783.6972, Restricted(b=0) Log-L =   -3378.6375 |
|             LogAmemiyaPrCrt.=   11.176, Akaike Info. Crt.=     14.014 |
| Autocorrel: Durbin-Watson Statistic =   2.04578,    Rho =     -.02289 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =  1657.1314, with   4 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant -27.22131190      22.344763       -1.218   .2239
 CAPITAL    .3791452472     .68364471E-01    5.546   .0000  389.93770
 WAGES     1.807596174      .14439298       12.519   .0000  193.06197
 AGE       1.942254199     1.6365340         1.187   .2360  10.354271
 MPORT      .8835870719E-01 .11911919         .742   .4587  294.92200
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = GVA      Mean=   515.7693387    , S.D.=   1177.746515     |
| Model size: Observations =      398, Parameters = 105, Deg.Fr.=   293 |
| Residuals:  Sum of squares= 11475462.21     , Std.Dev.=     197.90250 |
| Fit:        R-squared= .979161, Adjusted R-squared =          .97176 |
| Model test: F[104,    293] =  132.38,    Prob value =          .00000 |
| Diagnostic: Log-L =  -2608.3222, Restricted(b=0) Log-L =   -3378.6375 |
|             LogAmemiyaPrCrt.=   10.810, Akaike Info. Crt.=     13.635 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL    .3520192912     .38267403E-01    9.199   .0000  389.93770
 WAGES     1.656787676      .54712386E-01   30.282   .0000  193.06197
 AGE       -.4452627766    2.2240172         -.200   .8414  10.354271
 MPORT      .2029337865     .49535384E-01    4.097   .0001  294.92200
+-----------------------------------------------------------------------+
|                Test Statistics for the Classical Model                |
|                                                                       |
|       Model               Log-Likelihood    Sum of Squares   R-squared |
| (1)  Constant term only    -3378.63745   .5506734810D+09    .0000000 |
| (2)  Group effects only    -3213.67107   .2403665880D+09    .5635043 |
| (3)  X - variables only    -2783.69716   .2770165895D+08    .9496949 |
| (4)  X and group effects   -2608.32218   .1147546221D+08    .9791610 |
|                                                                       |
|                           Hypothesis Tests                            |
|               Likelihood Ratio Test               F Tests             |
|          Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)   329.933    100     .00000     3.834  100   297     .00000 |
| (3) vs (1)  1189.881      4     .00000  1854.834    4   393     .00000 |
| (4) vs (1)  1540.631    104     .00000   132.377  104   293     .00000 |
| (4) vs (2)  1210.698      4     .00000  1461.054    4   293     .00000 |
| (4) vs (3)   350.750    100     .00000     4.143  100   293     .00000 |
+-----------------------------------------------------------------------+
```

```
+---------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)             |
| Estimates:  Var[e]              =   .391654D+05          |
|             Var[u]              =   .171857D+05          |
|             Corr[v(i,t),v(i,s)] =   .304976              |
| Lagrange Multiplier Test vs. Model (3) =  346.98         |
| ( 1 df, prob value =  .000000)                           |
| (High values of LM favor FEM/REM over CR model.)         |
| Fixed vs. Random Effects (Hausman)     =    9.12         |
| ( 4 df, prob value =  .058254)                           |
| (High (low) values of H favor FEM (REM).)                |
| Reestimated using GLS coefficients:                      |
| Estimates:  Var[e]              =   .393820D+05          |
|             Var[u]              =   .178605D+05          |
|             Sum of Squares          .281199D+08          |
|             R-squared               .949695D+00          |
+---------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL    .3588494390     .19226576E-01    18.664   .0000  389.93770
 WAGES     1.704915215      .42067938E-01    40.528   .0000  193.06197
 AGE       2.434977161     2.5774931           .945   .3448  10.354271
 MPORT      .1638101529     .30228671E-01     5.419   .0000  294.92200
 Constant -28.44780734     29.668776          -.959   .3376
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = GVA      Mean=   515.7693387    , S.D.=   1177.746515     |
| Model size: Observations =      398, Parameters = 113, Deg.Fr.=   285 |
| Residuals:  Sum of squares= 11090546.18    , Std.Dev.=     197.26682 |
| Fit:        R-squared=  .979789, Adjusted R-squared =          .97185 |
| Model test: F[112,     285] =  123.36,     Prob value =         .00000 |
| Diagnostic: Log-L =  -2601.5327, Restricted(b=0) Log-L =   -3378.6375 |
|             LogAmemiyaPrCrt.=    10.819, Akaike Info. Crt.=     13.641 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL    .3651363377     .24647714E-01    14.814   .0000  389.93770
 WAGES     1.673885228      .48979811E-01    34.175   .0000  193.06197
 AGE        .9811041891    9.6266794           .102   .9189  10.354271
 MPORT      .1923118574     .34785425E-01     5.529   .0000  294.92200
 Constant -16.65027499    100.30874          -.166   .8682
+------------------------------------------------------------------------+
|                Test Statistics for the Classical Model                 |
|                                                                        |
|          Model             Log-Likelihood    Sum of Squares   R-squared |
| (1)  Constant term only    -3378.63745   .5506734810D+09    .0000000 |
| (2)  Group effects only    -3213.67107   .2403665880D+09    .5635043 |
| (3)  X - variables only    -2783.69716   .2770165895D+08    .9496949 |
| (4)  X and group effects   -2608.32218   .1147546221D+08    .9791610 |
| (5)  X ind.&time effects   -2602.22973   .1112946038D+08    .9797894 |
|                                                                        |
|                            Hypothesis Tests                            |
|              Likelihood Ratio Test               F Tests               |
|           Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)    329.933    100    .00000     3.834   100   297     .00000 |
| (3) vs (1)   1189.881      4    .00000  1854.834     4   393     .00000 |
| (4) vs (1)   1540.631    104    .00000   132.377   104   293     .00000 |
| (4) vs (2)   1210.698      4    .00000  1461.054     4   293     .00000 |
| (4) vs (3)    350.750    100    .00000     4.143   100   293     .00000 |
| (5) vs (4)     12.185      7    .09464     1.270     7   286     .26493 |
| (5) vs (3)    362.935    108    .00000     3.943   108   286     .00000 |
+------------------------------------------------------------------------+
```

```
+--------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)    |
| Estimates:  Var[e]              =   .389142D+05        |
|             Var[u]              =   .295326D+05        |
|             Corr[v(i,t),v(i,s)] =   .431468            |
|             Var[w]              =   .845180D+03        |
|             Corr[v(i,t),v(j,t)] =   .021257            |
| Lagrange Multiplier Test vs. Model (3) =  348.24       |
| ( 2 df, prob value =  .000000)                         |
| (High values of LM favor FEM/REM over CR model.)       |
| Fixed vs. Random Effects (Hausman)     =    5.88       |
| ( 4 df, prob value =  .208280)                         |
| (High (low) values of H favor FEM (REM).)              |
| Reestimated using GLS coefficients:                    |
| Estimates:  Var[e]              =   .396253D+05        |
|             Var[u]              =   .180038D+05        |
|             Var[w]              =   .122337D+04        |
|             Sum of Squares          .282476D+08        |
|             R-squared               .949695D+00        |
+--------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
CAPITAL	.3577668462	.20432387E-01	17.510	.0000	389.93770
WAGES	1.689698869	.43772456E-01	38.602	.0000	193.06197
AGE	2.045989172	3.1492764	.650	.5159	10.354271
MPORT	.1748081444	.31411556E-01	5.565	.0000	294.92200
Constant	-20.72347263	38.309636	-.541	.5885	

Lhs=DOMESTIC;Rhs=ONE,CAPITAL,WAGES,AGE,MPORT

```
+-----------------------------------------------------------------------+
| OLS Without Group Dummy Variables                                     |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = DOMESTIC Mean=   757.8327736    , S.D.=   1515.674858     |
| Model size: Observations =      398, Parameters =   5, Deg.Fr.=   393 |
| Residuals:  Sum of squares= 93923914.35     , Std.Dev.=     488.86823 |
| Fit:        R-squared=  .897015, Adjusted R-squared =          .89597 |
| Model test: F[  4,     393] =  855.77,     Prob value =         .00000 |
| Diagnostic: Log-L =  -3026.6747, Restricted(b=0) Log-L =   -3479.0361 |
|             LogAmemiyaPrCrt.=   12.397, Akaike Info. Crt.=     15.235 |
| Autocorrel: Durbin-Watson Statistic =   2.07261,   Rho =      -.03631 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =  2269.7389, with   4 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant  54.68157826      50.952407        1.073   .2838
 CAPITAL   1.282041058      .59620073E-01   21.504   .0000  389.93770
 WAGES     1.475394232      .35520838        4.154   .0000  193.06197
 AGE       .8228344103      5.6891691         .145   .8851  10.354271
 MPORT     -.3055970858     .15482854       -1.974   .0491  294.92200
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = DOMESTIC Mean=   757.8327736    , S.D.=   1515.674858     |
| Model size: Observations =      398, Parameters = 105, Deg.Fr.=   293 |
| Residuals:  Sum of squares= 26412934.50     , Std.Dev.=     300.24412 |
| Fit:        R-squared=  .971039, Adjusted R-squared =          .96076 |
| Model test: F[104,     293] =   94.46,     Prob value =         .00000 |
| Diagnostic: Log-L =  -2774.2171, Restricted(b=0) Log-L =   -3479.0361 |
|             LogAmemiyaPrCrt.=   11.643, Akaike Info. Crt.=     14.468 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL   1.100057147      .47235563E-01   23.289   .0000  389.93770
 WAGES     1.302508252      .11145266       11.687   .0000  193.06197
 AGE       -2.149003360     11.396587        -.189   .8505  10.354271
 MPORT     -.3121374431     .67211713E-01   -4.644   .0000  294.92200
+-----------------------------------------------------------------------+
|                 Test Statistics for the Classical Model               |
|                                                                       |
|        Model              Log-Likelihood    Sum of Squares   R-squared |
|  (1)  Constant term only    -3479.03610   .9120162998D+09    .0000000 |
|  (2)  Group effects only    -3244.54662   .2807090553D+09    .6922105 |
|  (3)  X - variables only    -3026.67471   .9392391435D+08    .8970151 |
|  (4)  X and group effects   -2774.21710   .2641293450D+08    .9710390 |
|                                                                       |
|                                Hypothesis Tests                       |
|                Likelihood Ratio Test               F Tests            |
|           Chi-squared    d.f.   Prob.          F    num. denom. Prob value |
|  (2) vs (1)    468.979    100    .00000      6.679  100   297    .00000 |
|  (3) vs (1)    904.723      4    .00000    855.773    4   393    .00000 |
|  (4) vs (1)   1409.638    104    .00000     94.462  104   293    .00000 |
|  (4) vs (2)    940.659      4    .00000    705.230    4   293    .00000 |
|  (4) vs (3)    504.915    100    .00000      7.489  100   293    .00000 |
+-----------------------------------------------------------------------+
```

```
+--------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)      |
| Estimates:  Var[e]              =   .901465D+05   |
|             Var[u]              =   .103670D+06   |
|             Corr[v(i,t),v(i,s)] =   .534888       |
| Lagrange Multiplier Test vs. Model (3) =  329.27  |
| ( 1 df, prob value =  .000000)                    |
| (High values of LM favor FEM/REM over CR model.)  |
| Fixed vs. Random Effects (Hausman)     =   59.18  |
| ( 4 df, prob value =  .000000)                    |
| (High (low) values of H favor FEM (REM).)         |
| Reestimated using GLS coefficients:               |
| Estimates:  Var[e]              =   .925385D+05   |
|             Var[u]              =   .164310D+06   |
|             Sum of Squares          .104256D+09   |
|             R-squared               .897015D+00   |
+--------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL    1.137190563     .31951054E-01    35.592   .0000   389.93770
 WAGES      1.388832023     .66769905E-01    20.800   .0000   193.06197
 AGE        1.352746309     5.3656258          .252   .8010   10.354271
 MPORT     -.3152999249     .48893155E-01    -6.449   .0000   294.92200
 Constant  106.4065783      61.698315         1.725   .0846

+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = DOMESTIC Mean=   757.8327736    , S.D.=   1515.674858     |
| Model size: Observations =     398, Parameters = 113, Deg.Fr.=    285 |
| Residuals:  Sum of squares= 25834458.84    , Std.Dev.=      301.07677 |
| Fit:        R-squared=  .971574, Adjusted R-squared =          .96040 |
| Model test: F[112,    285] =   86.97,    Prob value =          .00000 |
| Diagnostic: Log-L =  -2769.8103, Restricted(b=0) Log-L =   -3479.0361 |
|             LogAmemiyaPrCrt.=   11.665, Akaike Info. Crt.=     14.486 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL    1.096051064     .37618361E-01    29.136   .0000   389.93770
 WAGES      1.292918184     .74755013E-01    17.295   .0000   193.06197
 AGE       -2.744345305     14.692636         -.187   .8519   10.354271
 MPORT     -.3072631547     .53090954E-01    -5.787   .0000   294.92200
 Constant  199.8621797      153.09535         1.305   .1925
+------------------------------------------------------------------------+
|                    Test Statistics for the Classical Model             |
|                                                                        |
|          Model             Log-Likelihood    Sum of Squares   R-squared |
| (1)   Constant term only    -3479.03610    .9120162998D+09    .0000000  |
| (2)   Group effects only    -3244.54662    .2807090553D+09    .6922105  |
| (3)   X - variables only    -3026.67471    .9392391435D+08    .8970151  |
| (4)   X and group effects   -2774.21710    .2641293450D+08    .9710390  |
| (5)   X ind.&time effects   -2770.50735    .2592510606D+08    .9715739  |
|                                                                        |
|                              Hypothesis Tests                          |
|                  Likelihood Ratio Test               F Tests           |
|             Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)    468.979    100     .00000      6.679  100    297     .00000 |
| (3) vs (1)    904.723      4     .00000    855.773    4    393     .00000 |
| (4) vs (1)   1409.638    104     .00000     94.462  104    293     .00000 |
| (4) vs (2)    940.659      4     .00000    705.230    4    293     .00000 |
| (4) vs (3)    504.915    100     .00000      7.489  100    293     .00000 |
| (5) vs (4)      7.420      7     .38654       .769    7    286     .61393 |
| (5) vs (3)    512.335    108     .00000      6.946  108    286     .00000 |
+------------------------------------------------------------------------+
```

```
+--------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)    |
| Estimates:  Var[e]                =   .906472D+05      |
|             Var[u]                =   .207241D+06      |
|             Corr[v(i,t),v(i,s)] =   .695701            |
|             Var[w]                =   .186970D+04      |
|             Corr[v(i,t),v(j,t)] =   .020209            |
| Lagrange Multiplier Test vs. Model (3) =  329.51       |
| ( 2 df, prob value =  .000000)                         |
| (High values of LM favor FEM/REM over CR model.)       |
| Fixed vs. Random Effects (Hausman)     =   10.14       |
| ( 4 df, prob value =  .038087)                         |
| (High (low) values of H favor FEM (REM).)              |
| Reestimated using GLS coefficients:                    |
| Estimates:  Var[e]                =   .932745D+05      |
|             Var[u]                =   .171418D+06      |
|             Var[w]                =   .299398D+04      |
|             Sum of Squares            .107109D+09      |
|             R-squared                 .897015D+00      |
+--------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
CAPITAL	1.124137879	.33820411E-01	33.238	.0000	389.93770
WAGES	1.362482660	.69426206E-01	19.625	.0000	193.06197
AGE	1.011998736	7.0751411	.143	.8863	10.354271
MPORT	-.3155831163	.50601638E-01	-6.237	.0000	294.92200
Constant	120.2217478	85.486623	1.406	.1596	

Lhs=XPORT;Rhs=ONE,CAPITAL,WAGES,AGE,MPORT

```
+-----------------------------------------------------------------------+
| OLS Without Group Dummy Variables                                     |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = XPORT    Mean=   535.6331702     , S.D.=   1468.382360    |
| Model size: Observations =      398, Parameters =   5, Deg.Fr.=   393 |
| Residuals:  Sum of squares= 67287851.12     , Std.Dev.=     413.78244 |
| Fit:        R-squared=  .921392, Adjusted R-squared =          .92059 |
| Model test: F[  4,     393] = 1151.62,    Prob value =         .00000 |
| Diagnostic: Log-L =  -2960.3072, Restricted(b=0) Log-L =   -3466.4197 |
|             LogAmemiyaPrCrt.=   12.063, Akaike Info. Crt.=     14.901 |
| Autocorrel: Durbin-Watson Statistic =   2.01966,    Rho =     -.00983 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =  2017.0800, with   4 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant -86.72097643      45.303452       -1.914   .0563
 CAPITAL   .1037871285      .59828958E-01    1.735   .0836  389.93770
 WAGES     .6364115866      .25923679        2.455   .0145  193.06197
 AGE       6.076085309      4.6214688        1.315   .1894  10.354271
 MPORT     1.343078242      .90454100E-01   14.848   .0000  294.92200
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = XPORT    Mean=   535.6331702     , S.D.=   1468.382360    |
| Model size: Observations =      398, Parameters = 105, Deg.Fr.=   293 |
| Residuals:  Sum of squares= 30169341.42     , Std.Dev.=     320.88477 |
| Fit:        R-squared=  .964755, Adjusted R-squared =          .95224 |
| Model test: F[104,     293] =    77.12,    Prob value =         .00000 |
| Diagnostic: Log-L =  -2800.6786, Restricted(b=0) Log-L =   -3466.4197 |
|             LogAmemiyaPrCrt.=   11.776, Akaike Info. Crt.=     14.601 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL   .2414972920      .59234330E-01    4.077   .0001  389.93770
 WAGES     .7595206977      .11679872        6.503   .0000  193.06197
 AGE       2.874642858      13.743276         .209   .8344  10.354271
 MPORT     1.308199971      .80654198E-01   16.220   .0000  294.92200
+-----------------------------------------------------------------------+
|                  Test Statistics for the Classical Model              |
|                                                                       |
|          Model              Log-Likelihood    Sum of Squares   R-squared |
| (1)  Constant term only    -3466.41973    .8559902616D+09    .0000000 |
| (2)  Group effects only    -3328.74751    .4285634596D+09    .4993361 |
| (3)  X - variables only    -2960.30715    .6728785112D+08    .9213918 |
| (4)  X and group effects   -2800.67861    .3016934142D+08    .9647550 |
|                                                                       |
|                              Hypothesis Tests                         |
|                Likelihood Ratio Test               F Tests            |
|           Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)    275.344    100     .00000     2.962  100    297     .00000 |
| (3) vs (1)   1012.225      4     .00000  1151.620    4    393     .00000 |
| (4) vs (1)   1331.482    104     .00000    77.118  104    293     .00000 |
| (4) vs (2)   1056.138      4     .00000   967.286    4    293     .00000 |
| (4) vs (3)    319.257    100     .00000     3.605  100    293     .00000 |
+-----------------------------------------------------------------------+
```

```
+--------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)     |
| Estimates:  Var[e]              =  .102967D+06   |
|             Var[u]              =  .748106D+05   |
|             Corr[v(i,t),v(i,s)] =  .420810       |
| Lagrange Multiplier Test vs. Model (3) =   42.64 |
| ( 1 df, prob value =  .000000)                   |
| (High values of LM favor FEM/REM over CR model.) |
| Fixed vs. Random Effects (Hausman)     =   35.63 |
| ( 4 df, prob value =  .000000)                   |
| (High (low) values of H favor FEM (REM).)        |
| Reestimated using GLS coefficients:              |
| Estimates:  Var[e]              =  .105205D+06   |
|             Var[u]              =  .101507D+06   |
|             Sum of Squares         .699253D+08   |
|             R-squared              .921392D+00   |
+--------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL   .1961018390     .32818648E-01    5.975   .0000  389.93770
 WAGES     .6712591136     .70009483E-01    9.588   .0000  193.06197
 AGE       5.272591658     4.8992098        1.076   .2818  10.354271
 MPORT     1.325217980     .50846536E-01   26.063   .0000  294.92200
 Constant -119.1687564     56.255066       -2.118   .0341
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = XPORT    Mean=   535.6331702    , S.D.=   1468.382360     |
| Model size: Observations =     398, Parameters = 113, Deg.Fr.=    285 |
| Residuals:  Sum of squares= 29395695.74    , Std.Dev.=      321.15852 |
| Fit:        R-squared= .965538, Adjusted R-squared =          .95200 |
| Model test: F[112,    285] =   71.30,    Prob value =          .00000 |
| Diagnostic: Log-L =  -2795.5090, Restricted(b=0) Log-L =   -3466.4197 |
|             LogAmemiyaPrCrt.=   11.794, Akaike Info. Crt.=     14.616 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 CAPITAL   .2385296722     .40127495E-01    5.944   .0000  389.93770
 WAGES     .7432343271     .79741153E-01    9.321   .0000  193.06197
 AGE       5.875515697     15.672631         .375   .7079  10.354271
 MPORT     1.306781811     .56632107E-01   23.075   .0000  294.92200
 Constant -147.1042138     163.30677        -.901   .3683
+------------------------------------------------------------------------+
|                Test Statistics for the Classical Model                 |
|                                                                        |
|        Model               Log-Likelihood    Sum of Squares    R-squared |
| (1)   Constant term only    -3466.41973   .8559902616D+09     .0000000 |
| (2)   Group effects only    -3328.74751   .4285634596D+09     .4993361 |
| (3)   X - variables only    -2960.30715   .6728785112D+08     .9213918 |
| (4)   X and group effects   -2800.67861   .3016934142D+08     .9647550 |
| (5)   X ind.&time effects   -2796.20602   .2949883853D+08     .9655383 |
|                                                                        |
|                           Hypothesis Tests                             |
|              Likelihood Ratio Test                F Tests             |
|          Chi-squared   d.f.   Prob.         F     num. denom. Prob value |
| (2) vs (1)   275.344   100      .00000     2.962  100   297      .00000 |
| (3) vs (1)  1012.225     4      .00000  1151.620    4   393      .00000 |
| (4) vs (1)  1331.482   104      .00000    77.118  104   293      .00000 |
| (4) vs (2)  1056.138     4      .00000   967.286    4   293      .00000 |
| (4) vs (3)   319.257   100      .00000     3.605  100   293      .00000 |
| (5) vs (4)     8.945     7      .25662      .929    7   286      .48452 |
| (5) vs (3)   328.202   108      .00000     3.392  108   286      .00000 |
+------------------------------------------------------------------------+
```

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+--------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)    |
| Estimates:  Var[e]              =   .103143D+06        |
|             Var[u]              =   .140363D+06        |
|             Corr[v(i,t),v(i,s)] =   .576426            |
|             Var[w]              =   .960085D+03        |
|             Corr[v(i,t),v(j,t)] =   .009222            |
| Lagrange Multiplier Test vs. Model (3) =   43.04       |
| ( 2 df, prob value =  .000000)                         |
| (High values of LM favor FEM/REM over CR model.)       |
| Fixed vs. Random Effects (Hausman)     =    3.78       |
| ( 4 df, prob value =  .436849)                         |
| (High (low) values of H favor FEM (REM).)              |
| Reestimated using GLS coefficients:                    |
| Estimates:  Var[e]              =   .104848D+06        |
|             Var[u]              =   .105742D+06        |
|             Var[w]              =  -.632791D+03        |
|             Sum of Squares          .711161D+08        |
|             R-squared               .921392D+00        |
+--------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
CAPITAL	.2116960232	.34805909E-01	6.082	.0000	389.93770
WAGES	.6922655560	.72511650E-01	9.547	.0000	193.06197
AGE	5.196434737	6.2158256	.836	.4032	10.354271
MPORT	1.319769307	.52810817E-01	24.991	.0000	294.92200
Constant	-123.6357606	73.239807	-1.688	.0914	

Lhs=SELF;Rhs=ONE,AGE,VERTICAL

```
+-----------------------------------------------------------------------+
| OLS Without Group Dummy Variables                                     |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = SELF     Mean=   3.494527033    , S.D.=   14.45177500     |
| Model size: Observations =     398, Parameters =   3, Deg.Fr.=    395 |
| Residuals:  Sum of squares= 82733.13812    , Std.Dev.=      14.47242 |
| Fit:        R-squared=  .002193, Adjusted R-squared =        -.00286 |
| Model test: F[  2,     395] =     .43,    Prob value =         .64819 |
| Diagnostic: Log-L =  -1626.7853, Restricted(b=0) Log-L =   -1627.2222 |
|             LogAmemiyaPrCrt.=    5.352, Akaike Info. Crt.=      8.190 |
| Autocorrel: Durbin-Watson Statistic =   1.98120,   Rho =       .00940 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =    90.4785, with   2 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant  3.802847451      1.6061123         2.368   .0184
 AGE      -.5053182824E-01  .11068749         -.457   .6483   10.354271
 VERTICAL  .4853989314      .36556308         1.328   .1850   .44272830
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = SELF     Mean=   3.494527033    , S.D.=   14.45177500     |
| Model size: Observations =     398, Parameters = 103, Deg.Fr.=    295 |
| Residuals:  Sum of squares= 15565.86458    , Std.Dev.=       7.26400 |
| Fit:        R-squared=  .812267, Adjusted R-squared =         .74736 |
| Model test: F[102,     295] =   12.51,    Prob value =         .00000 |
| Diagnostic: Log-L =  -1294.3479, Restricted(b=0) Log-L =   -1627.2222 |
|             LogAmemiyaPrCrt.=    4.196, Akaike Info. Crt.=      7.022 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 AGE       1.220916163      .70615184         1.729   .0846   10.354271
 VERTICAL  .3884129721E-01  .49207523E-01     .789   .4304   .44272830
+------------------------------------------------------------------------+
|               Test Statistics for the Classical Model                  |
|                                                                        |
|         Model           Log-Likelihood    Sum of Squares    R-squared   |
| (1)   Constant term only    -1627.22217   .8291495885D+05     .0000000   |
| (2)   Group effects only    -1302.33941   .1620368674D+05     .8045746   |
| (3)   X - variables only    -1626.78531   .8273313812D+05     .0021929   |
| (4)   X and group effects   -1294.34788   .1556586458D+05     .8122671   |
|                                                                        |
|                           Hypothesis Tests                             |
|              Likelihood Ratio Test               F Tests               |
|          Chi-squared   d.f.   Prob.          F    num. denom. Prob value |
| (2) vs (1)   649.766    100    .00000    12.228  100    297     .00000 |
| (3) vs (1)      .874      2    .64606      .434    2    395     .64819 |
| (4) vs (1)   665.749    102    .00000    12.514  102    295     .00000 |
| (4) vs (2)    15.983      2    .00034     6.044    2    295     .00268 |
| (4) vs (3)   664.875    100    .00000    12.729  100    295     .00000 |
+------------------------------------------------------------------------+
```

```
+----------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)       |
| Estimates:  Var[e]              =   .527656D+02    |
|             Var[u]              =   .571407D+03    |
|             Corr[v(i,t),v(i,s)] =   .915463        |
| Lagrange Multiplier Test vs. Model (3) =       .62 |
| ( 1 df, prob value =  .432090)                     |
| (High values of LM favor FEM/REM over CR model.)   |
| Fixed vs. Random Effects (Hausman)      =     8.70 |
| ( 2 df, prob value =  .012896)                     |
| (High (low) values of H favor FEM (REM).)          |
| Reestimated using GLS coefficients:                |
| Estimates:  Var[e]              =   .533944D+02    |
|             Var[u]              =   .605033D+03    |
|             Sum of Squares          .922140D+05    |
|             R-squared               .219286D-02    |
+----------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 AGE       .5628325955     .26090935        2.157   .0310  10.354271
 VERTICAL  .5833768046E-01 .33906437         .172   .8634   .44272830
 Constant  .2465429185     3.4056279         .072   .9423
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = SELF      Mean=   3.494527033     , S.D.=   14.45177500   |
| Model size: Observations =      398, Parameters = 111, Deg.Fr.=   287 |
| Residuals:  Sum of squares= 15059.89667     , Std.Dev.=       7.24386 |
| Fit:        R-squared=  .817737, Adjusted R-squared =          .74788 |
| Model test: F[110,     287] =   11.71,     Prob value =        .00000 |
| Diagnostic: Log-L =  -1287.7719, Restricted(b=0) Log-L =   -1627.2222 |
|             LogAmemiyaPrCrt.=     4.206, Akaike Info. Crt.=     7.029 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 AGE       1.318374810     .35337707        3.731   .0002  10.354271
 VERTICAL  .1075540996     .34182615         .315   .7532   .44272830
 Constant -10.20390075     3.6820585       -2.771   .0058
+-------------------------------------------------------------------------+
|                  Test Statistics for the Classical Model                |
|                                                                         |
|         Model              Log-Likelihood    Sum of Squares    R-squared |
| (1)   Constant term only    -1627.22217    .8291495885D+05     .0000000 |
| (2)   Group effects only    -1302.33941    .1620368674D+05     .8045746 |
| (3)   X - variables only    -1626.78531    .8273313812D+05     .0021929 |
| (4)   X and group effects   -1294.34788    .1556586458D+05     .8122671 |
| (5)   X ind.&time effects   -1288.46410    .1511237018D+05     .8177365 |
|                                                                         |
|                                 Hypothesis Tests                        |
|                 Likelihood Ratio Test                 F Tests           |
|            Chi-squared    d.f.  Prob.            F    num. denom. Prob value |
| (2) vs (1)    649.766     100     .00000     12.228  100   297     .00000 |
| (3) vs (1)       .874       2     .64606       .434    2   395     .64819 |
| (4) vs (1)    665.749     102     .00000     12.514  102   295     .00000 |
| (4) vs (2)     15.983       2     .00034      6.044    2   295     .00268 |
| (4) vs (3)    664.875     100     .00000     12.729  100   295     .00000 |
| (5) vs (4)     11.768       7     .10847      1.235    7   288     .28354 |
| (5) vs (3)    676.642     108     .00000     11.932  108   288     .00000 |
+-------------------------------------------------------------------------+
```

```
+--------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)    |
| Estimates:  Var[e]              =   .524735D+02        |
|             Var[u]              =   .571499D+03        |
|             Corr[v(i,t),v(i,s)] =   .915904            |
|             Var[w]              =   .101603D+01        |
|             Corr[v(i,t),v(j,t)] =   .018995            |
| Lagrange Multiplier Test vs. Model (3) =     .62       |
| ( 2 df, prob value =  .733976)                         |
| (High values of LM favor FEM/REM over CR model.)       |
| Fixed vs. Random Effects (Hausman)     =    8.22       |
| ( 2 df, prob value =  .016391)                         |
| (High (low) values of H favor FEM (REM).)              |
| Reestimated using GLS coefficients:                    |
| Estimates:  Var[e]              =   .591384D+02        |
|             Var[u]              =   .608843D+03        |
|             Var[w]              =   .100971D+02        |
|             Sum of Squares          .926270D+05        |
|             R-squared               .219286D-02        |
+--------------------------------------------------------+
```

ariable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
GE	.6395097471	.26210624	2.440	.0147	10.354271
ERTICAL	.1038184996	.33932632	.306	.7596	.44272830
onstant	-1.334625122	3.6069270	-.370	.7114	

Lhs=LOGPROD;Rhs=ONE,LOGXPORT,LOGAGE

```
+-----------------------------------------------------------------------+
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722    , S.D.=   1.355297611     |
| Model size: Observations =     398, Parameters =   3, Deg.Fr.=    395 |
| Residuals:  Sum of squares= 666.7384579     , Std.Dev.=       1.29921 |
| Fit:        R-squared=  .085685, Adjusted R-squared =          .08106 |
| Model test: F[  2,     395] =   18.51,    Prob value =          .00000 |
| Diagnostic: Log-L =    -667.4108, Restricted(b=0) Log-L =   -685.2373 |
|             LogAmemiyaPrCrt.=     .531, Akaike Info. Crt.=      3.369 |
| Autocorrel: Durbin-Watson Statistic =   1.90398,    Rho =      .04801 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =    63.0165, with    2 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant  1.545417344     .22840370         6.766   .0000
 LOGXPORT -.1399904451     .25957835E-01    -5.393   .0000   3.1340505
 LOGAGE    .4108749838     .12300602         3.340   .0009   2.1626128

+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722    , S.D.=   1.355297611     |
| Model size: Observations =     398, Parameters = 103, Deg.Fr.=    295 |
| Residuals:  Sum of squares= 145.1959102     , Std.Dev.=        .70156 |
| Fit:        R-squared=  .800889, Adjusted R-squared =          .73204 |
| Model test: F[102,     295] =   11.63,    Prob value =          .00000 |
| Diagnostic: Log-L =    -364.0723, Restricted(b=0) Log-L =   -685.2373 |
|             LogAmemiyaPrCrt.=    -.479, Akaike Info. Crt.=      2.347 |
| Estd. Autocorrelation of e(i,t)      .000000                          |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 LOGXPORT -.3027615772E-01  .35600743E-01    -.850   .3956   3.1340505
 LOGAGE    .1334708430      .25707348         .519   .6039   2.1626128

+-----------------------------------------------------------------------+
|                Test Statistics for the Classical Model                |
|                                                                       |
|        Model              Log-Likelihood    Sum of Squares   R-squared |
|  (1)  Constant term only     -685.23729   .7292221513D+03    .0000000 |
|  (2)  Group effects only     -364.73607   .1456810296D+03    .8002241 |
|  (3)  X - variables only     -667.41076   .6667384579D+03    .0856854 |
|  (4)  X and group effects    -364.07229   .1451959102D+03    .8008893 |
|                                                                       |
|                           Hypothesis Tests                            |
|              Likelihood Ratio Test                F Tests             |
|          Chi-squared   d.f.   Prob.          F    num. denom. Prob value |
|  (2) vs (1)   641.002   100    .00000    11.897  100   297      .00000 |
|  (3) vs (1)    35.653     2    .00000    18.509    2   395      .00000 |
|  (4) vs (1)   642.330   102    .00000    11.633  102   295      .00000 |
|  (4) vs (2)     1.328     2    .51490      .493    2   295      .61140 |
|  (4) vs (3)   606.677   100    .00000    10.596  100   295      .00000 |
-------------------------------------------------------------------------
```

```
+--------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)     |
| Estimates:  Var[e]              =   .492190D+00  |
|             Var[u]              =   .123415D+01  |
|             Corr[v(i,t),v(i,s)] =   .714894      |
| Lagrange Multiplier Test vs. Model (3) =  362.32 |
| ( 1 df, prob value =  .000000)                   |
| (High values of LM favor FEM/REM over CR model.) |
| Fixed vs. Random Effects (Hausman)     =    4.52 |
| ( 2 df, prob value =  .104514)                   |
| (High (low) values of H favor FEM (REM).)        |
| Reestimated using GLS coefficients:              |
| Estimates:  Var[e]              =   .494731D+00  |
|             Var[u]              =   .126068D+01  |
|             Sum of Squares          .686122D+03  |
|             R-squared               .856854D-01  |
+--------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 LOGXPORT -.6522428485E-01  .26603413E-01    -2.452   .0142  3.1340505
 LOGAGE    .3767133835      .17677898         2.131   .0331  2.1626128
 Constant  1.354483693      .37208266         3.640   .0003
```

```
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722    , S.D.=   1.355297611     |
| Model size: Observations =     398, Parameters = 111, Deg.Fr.=    287 |
| Residuals:  Sum of squares= 142.6045539    , Std.Dev.=         .70490 |
| Fit:        R-squared=  .803762, Adjusted R-squared =          .72855 |
| Model test: F[110,    287] =   10.69,    Prob value =          .00000 |
| Diagnostic: Log-L =    -360.4886, Restricted(b=0) Log-L =   -685.2373 |
|             LogAmemiyaPrCrt.=    -.453, Akaike Info. Crt.=      2.369 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 LOGXPORT -.3353130643E-01  .36124095E-01     -.928   .3539  3.1340505
 LOGAGE    .9367820702E-01  .41605064          .225   .8220  2.1626128
 Constant  1.897742840      .90368573         2.100   .0364
```

```
+------------------------------------------------------------------------+
|                Test Statistics for the Classical Model                 |
|                                                                        |
|        Model              Log-Likelihood    Sum of Squares    R-squared |
| (1)  Constant term only     -685.23729    .7292221513D+03     .0000000 |
| (2)  Group effects only     -364.73607    .1456810296D+03     .8002241 |
| (3)  X - variables only     -667.41076    .6667384579D+03     .0856854 |
| (4)  X and group effects    -364.07229    .1451959102D+03     .8008893 |
| (5)  X ind.&time effects    -361.18078    .1431014339D+03     .8037615 |
|                                                                        |
|                             Hypothesis Tests                           |
|                Likelihood Ratio Test                   F Tests         |
|            Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)    641.002    100     .00000    11.897  100    297     .00000 |
| (3) vs (1)     35.653      2     .00000    18.509    2    395     .00000 |
| (4) vs (1)    642.330    102     .00000    11.633  102    295     .00000 |
| (4) vs (2)      1.328      2     .51490      .493    2    295     .61140 |
| (4) vs (3)    606.677    100     .00000    10.596  100    295     .00000 |
| (5) vs (4)      5.783      7     .56530      .602    7    288     .75401 |
| (5) vs (3)    612.460    108     .00000     9.758  108    288     .00000 |
+------------------------------------------------------------------------+
```

```
+--------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)    |
| Estimates:  Var[e]              =   .496880D+00        |
|             Var[u]              =   .144129D+01        |
|             Corr[v(i,t),v(i,s)] =   .743635            |
|             Var[w]              =   .265941D-01        |
|             Corr[v(i,t),v(j,t)] =   .050803            |
| Lagrange Multiplier Test vs. Model (3) =  362.92       |
| ( 2 df, prob value =  .000000)                         |
| (High values of LM favor FEM/REM over CR model.)       |
| Fixed vs. Random Effects (Hausman)     =    1.95       |
| ( 2 df, prob value =  .376563)                         |
| (High (low) values of H favor FEM (REM).)              |
| Reestimated using GLS coefficients:                    |
| Estimates:  Var[e]              =   .526429D+00        |
|             Var[u]              =   .125829D+01        |
|             Var[w]              =   .106287D-01        |
|             Sum of Squares          .689767D+03        |
|             R-squared               .856854D-01        |
+--------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
LOGXPORT	-.5741561542E-01	.28366204E-01	-2.024	.0430	3.1340505
LOGAGE	.3683929287	.19665828	1.873	.0610	2.1626128
Constant	1.381594685	.42393658	3.259	.0011	

Lhs=LOGPROD;Rhs=ONE,LOGAGE,SELF,VERTICAL

```
+-----------------------------------------------------------------------+
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722     , S.D.=   1.355297611     |
| Model size: Observations =      398, Parameters =   4, Deg.Fr.=    394 |
| Residuals:  Sum of squares= 722.3981308     , Std.Dev.=        1.35407 |
| Fit:        R-squared=  .009358, Adjusted R-squared =           .00181 |
| Model test: F[  3,     394] =     1.24,     Prob value =        .29464 |
| Diagnostic: Log-L =    -683.3663, Restricted(b=0) Log-L =    -685.2373 |
|             LogAmemiyaPrCrt.=     .616, Akaike Info. Crt.=      3.454 |
| Autocorrel: Durbin-Watson Statistic =   1.92786,    Rho =      .03607 |
| Results Corrected for heteroskedasticity                              |
| Breusch - Pagan chi-squared =     8.4033, with    3 degrees of freedom |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 Constant  1.695982244      .22756523        7.453   .0000
 LOGAGE    .1238469983      .10198447        1.214   .2253  2.1626128
 SELF     -.1630217792E-02  .48098305E-02    -.339   .7348  3.4945270
 VERTICAL  .8385552598E-01  .54154695E-01    1.548   .1223  .44272830

+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables                              |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722     , S.D.=   1.355297611     |
| Model size: Observations =      398, Parameters = 104, Deg.Fr.=    294 |
| Residuals:  Sum of squares= 131.7707766     , Std.Dev.=         .66948 |
| Fit:        R-squared=  .819300, Adjusted R-squared =           .75599 |
| Model test: F[103,     294] =    12.94,     Prob value =        .00000 |
| Diagnostic: Log-L =    -344.7653, Restricted(b=0) Log-L =    -685.2373 |
|             LogAmemiyaPrCrt.=    -.570, Akaike Info. Crt.=      2.255 |
| Estd. Autocorrelation of e(i,t)     .000000                           |
| White/Hetero. corrected covariance matrix used.                       |
+-----------------------------------------------------------------------+
+---------+--------------+----------------+--------+---------+----------+
|Variable | Coefficient  | Standard Error |t-ratio |P[|T|>t] | Mean of X|
+---------+--------------+----------------+--------+---------+----------+
 LOGAGE    .2757623531      .27921875         .988   .3239  2.1626128
 SELF     -.8390262697E-02  .37103173E-02   -2.261   .0243  3.4945270
 VERTICAL  .1677901323      .15671290E-01   10.707   .0000  .44272830


+-----------------------------------------------------------------------+
|                Test Statistics for the Classical Model                |
|                                                                       |
|        Model              Log-Likelihood    Sum of Squares   R-squared |
| (1)  Constant term only     -685.23729    .7292221513D+03   .0000000 |
| (2)  Group effects only     -364.73607    .1456810296D+03   .8002241 |
| (3)  X - variables only     -683.36629    .7223981308D+03   .0093579 |
| (4)  X and group effects    -344.76530    .1317707766D+03   .8192995 |
|                                                                       |
|                           Hypothesis Tests                            |
|               Likelihood Ratio Test               F Tests             |
|          Chi-squared   d.f.  Prob.          F    num. denom. Prob value |
| (2) vs (1)   641.002    100    .00000     11.897  100   297     .00000 |
| (3) vs (1)     3.742      3    .29071      1.241    3   394     .29464 |
| (4) vs (1)   680.944    103    .00000     12.942  103   294     .00000 |
| (4) vs (2)    39.942      3    .00000     10.345    3   294     .00000 |
| (4) vs (3)   677.202    100    .00000     13.178  100   294     .00000 |
+-----------------------------------------------------------------------+
```

```
+---------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i)      |
| Estimates:  Var[e]              =   .448200D+00   |
|             Var[u]              =   .138922D+01   |
|             Corr[v(i,t),v(i,s)] =   .756071       |
| Lagrange Multiplier Test vs. Model (3) =  439.21  |
| ( 1 df, prob value =  .000000)                    |
| (High values of LM favor FEM/REM over CR model.)  |
| Fixed vs. Random Effects (Hausman)    =    4.34   |
| ( 3 df, prob value =  .227225)                    |
| (High (low) values of H favor FEM (REM).)         |
| Reestimated using GLS coefficients:               |
| Estimates:  Var[e]              =   .449875D+00   |
|             Var[u]              =   .142027D+01   |
|             Sum of Squares          .730375D+03   |
|             R-squared               .935794D-02   |
+---------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
LOGAGE	.2908523931	.17858078	1.629	.1034	2.1626128
SELF	-.3036889308E-02	.38310373E-02	-.793	.4279	3.4945270
VERTICAL	.1609481432	.30969142E-01	5.197	.0000	.44272830
Constant	1.295961391	.38414006	3.374	.0007	

```
+-----------------------------------------------------------------------+
| Least Squares with Group Dummy Variables and Period Effects           |
| Ordinary    least squares regression    Weighting variable = none     |
| Dep. var. = LOGPROD  Mean=   1.995243722    , S.D.=   1.355297611     |
| Model size: Observations =     398, Parameters = 112, Deg.Fr.=   286  |
| Residuals:  Sum of squares= 129.4085149    , Std.Dev.=        .67266  |
| Fit:        R-squared=  .821918, Adjusted R-squared =         .75280  |
| Model test: F[111,    286] =   11.89,     Prob value =         .00000  |
| Diagnostic: Log-L =   -341.1655, Restricted(b=0) Log-L =   -685.2373  |
|             LogAmemiyaPrCrt.=    -.545, Akaike Info. Crt.=     2.277  |
| Estd. Autocorrelation of e(i,t)      .000000                          |
+-----------------------------------------------------------------------+
```

Variable	Coefficient	Standard Error	t-ratio	P[|T|>t]	Mean of X
LOGAGE	.2325923256	.40648618	.572	.5675	2.1626128
SELF	-.7712613958E-02	.54742776E-02	-1.409	.1597	3.4945270
VERTICAL	.1694610355	.31747393E-01	5.338	.0000	.44272830
Constant	1.444163324	.87612244	1.648	.1001	

```
+------------------------------------------------------------------------+
|                 Test Statistics for the Classical Model                |
|                                                                        |
|        Model               Log-Likelihood    Sum of Squares   R-squared|
| (1)  Constant term only      -685.23729   .7292221513D+03    .0000000  |
| (2)  Group effects only      -364.73607   .1456810296D+03    .8002241  |
| (3)  X - variables only      -683.36629   .7223981308D+03    .0093579  |
| (4)  X and group effects     -344.76530   .1317707766D+03    .8192995  |
| (5)  X ind.&time effects     -341.86004   .1298609923D+03    .8219185  |
|                                                                        |
|                               Hypothesis Tests                         |
|             Likelihood Ratio Test                 F Tests              |
|          Chi-squared   d.f.   Prob.         F     num. denom. Prob value |
| (2) vs (1)   641.002   100      .00000   11.897  100    297     .00000 |
| (3) vs (1)     3.742     3      .29071    1.241    3    394     .29464 |
| (4) vs (1)   680.944   103      .00000   12.942  103    294     .00000 |
| (4) vs (2)    39.942     3      .00000   10.345    3    294     .00000 |
| (4) vs (3)   677.202   100      .00000   13.178  100    294     .00000 |
| (5) vs (4)     5.811     7      .56204     .603    7    287     .75337 |
| (5) vs (3)   683.013   108      .00000   12.125  108    287     .00000 |
+------------------------------------------------------------------------+
```

```
+--------------------------------------------------------------+
| Random Effects Model: v(i,t) = e(i,t) + u(i) + w(t)          |
| Estimates:  Var[e]                 =   .452477D+00           |
|             Var[u]                 =   .155062D+01           |
|             Corr[v(i,t),v(i,s)]    =   .774111               |
|             Var[w]                 =   .131246D-01           |
|             Corr[v(i,t),v(j,t)]    =   .028188               |
| Lagrange Multiplier Test vs. Model (3) =  439.63             |
| ( 2 df, prob value =  .000000)                               |
| (High values of LM favor FEM/REM over CR model.)             |
| Fixed vs. Random Effects (Hausman)     =    4.94             |
| ( 3 df, prob value =  .176584)                               |
| (High (low) values of H favor FEM (REM).)                    |
| Reestimated using GLS coefficients:                          |
| Estimates:  Var[e]                 =   .480603D+00           |
|             Var[u]                 =   .141110D+01           |
|             Var[w]                 =   .173270D-01           |
|             Sum of Squares             .728669D+03           |
|             R-squared                  .935794D-02           |
+--------------------------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]	Mean of X
LOGAGE	.2509590073	.19199265	1.307	.1912	2.1626128
SELF	-.2860204305E-02	.39523466E-02	-.724	.4693	3.4945270
VERTICAL	.1599872102	.31281285E-01	5.114	.0000	.44272830
Constant	1.413003633	.42681520	3.311	.0009	

Data appendix 3: Company names and codes

Company Name	Year	Code
Cauvery Software Engg. Systems Ltd.	92	13
Infosys Technologies Ltd.	92	25
Lan Eseda Inds. Ltd.	92	34
Mahindra-British Telecom Ltd.	92	41
Mastek Ltd.	92	43
P S I Data Systems Ltd.	92	55
Tata Infotech Ltd.	92	82
Kothari Information Systems Ltd	92	101
Cauvery Software Engg. Systems Ltd.	93	13
Datasoft Application Software (India) Ltd.	93	20
I I S Infotech Ltd.	93	97
Infosys Technologies Ltd.	93	25
Kirloskar Computer Services Ltd.	93	32
Kothari Information Systems Ltd.	93	101
Lan Eseda Inds. Ltd.	93	34
Mahindra-British Telecom Ltd.	93	41
Mastek Ltd.	93	43
N I I T Ltd.	93	47
P S I Data Systems Ltd.	93	5
R S Software (India) Ltd.	93	61
S Q L Star International Ltd.	93	64
S R G Infotec Ltd.	93	65
Silverline Technologies Ltd.	93	73
Svam Softwares Ltd.	93	80
Tata Infotech Ltd.	93	82
Aftek Infosys Ltd.	94	5
Appu Industries Ltd.	94	6
B F L Software Ltd.	94	8
Cauvery Software Engg. Systems Ltd.	94	13
Citicorp Information Technology Inds. Ltd.	94	14
Cyberspace Infosys Ltd.	94	17
D S Q Software Ltd.	94	19
Datasoft Application Software (India) Ltd.	94	20
Frontier Information Technologies Ltd.	94	91
I I S Infotech Ltd.	94	97
Info-Drive Software Ltd.	94	99
Infosys Technologies Ltd.	94	25
International Computers (India) Ltd.	94	27
Kirloskar Computer Services Ltd.	94	32
Kothari Information Systems Ltd.	94	101
Lan Eseda Inds. Ltd.	94	34
Lee & Nee Softwares (Exports) Ltd.	94	37
Mahindra-British Telecom Ltd.	94	41
Midpoint Software & Electro Systems Ltd.	94	95
N I I T Ltd.	94	47
P S I Data Systems Ltd.	94	55
R S Software (India) Ltd.	94	61
S Q L Star International Ltd.	94	64
S R G Infotec Ltd.	94	65
Satyam Computer Services Ltd.	94	67
Shukla Data Technics Ltd.	94	96
Siemens Information Systems Ltd.	94	71
Silverline Technologies Ltd.	94	73
Svam Softwares Ltd.	94	80
Synergy Log-In Systems Ltd.	94	81
Tata Infotech Ltd.	94	82
V J I L Consulting Ltd.	94	86
A D A Software & Services Pvt. Ltd.	95	1
Adam Comsof Ltd.	95	3
Aftek Infosys Ltd.	95	5
Appu Industries Ltd.	95	6
Aptech Ltd.	95	7

Company Name	Year	Code
B F L Software Ltd.	95	8
Cauvery Software Engg. Systems Ltd.	95	13
Citicorp Information Technology Inds. Ltd.	95	14
Computech International Ltd.	95	15
Cyberspace Infosys Ltd.	95	17
D S Q Software Ltd.	95	19
Datasoft Application Software (India) Ltd.	95	20
Frontier Information Technologies Ltd.	95	91
I E C Softwares Ltd.	95	24
I I S Infotech Ltd.	95	97
Indusa Information Technology Pvt. Ltd.	95	98
Info-Drive Software Ltd.	95	99
Infosys Technologies Ltd.	95	25
Innovation Software Exports Ltd.	95	26
International Computers (India) Ltd.	95	27
K L G Systel Ltd.	95	28
Kirloskar Computer Services Ltd.	95	32
Lan Eseda Inds. Ltd.	95	34
Leading Edge Systems Ltd.	95	36
Lee & Nee Softwares (Exports) Ltd.	95	37
Mahindra-British Telecom Ltd.	95	41
Mangalya Soft-Tech Ltd.	95	42
Mascon Technical Services Ltd.	95	89
Mastek Ltd.	95	43
Microtech Software & Consultants Ltd.	95	44
Midpoint Software & Electro Systems Ltd.	95	95
N I I T Ltd.	95	47
Nucleus Software Exports Ltd.	95	49
Omega Interactive Technologies Ltd.	95	52
Orient Information Technology Ltd.	95	54
P S I Data Systems Ltd.	95	55
Pentamedia Graphics Ltd.	95	58
Pentonville Software Ltd.	95	59
Polaris Software Lab Ltd.	95	60
R S Software (India) Ltd.	95	61
Radan Multimedia Ltd.	95	100
S R G Infotec Ltd.	95	65
Satyam Computer Services Ltd.	95	67
Shukla Data Technics Ltd.	95	96
Siemens Information Systems Ltd.	95	71
Sierra Optima Ltd.	95	72
Silverline Technologies Ltd.	95	73
S S I Ltd.	95	75
Soni Infosys Ltd.	95	77
Svam Softwares Ltd.	95	80
Synergy Log-In Systems Ltd.	95	81
Tata Infotech Ltd.	95	82
Tcil Bellsouth Ltd.	95	83
V J I L Consulting Ltd.	95	86
A D A Software & Services Pvt. Ltd.	96	1
A F L Infotech Ltd.	96	94
Ace Software Exports Ltd.	96	2
Adam Comsof Ltd.	96	3
Appu Industries Ltd.	96	6
Aptech Ltd.	96	7
B F L Software Ltd.	96	8
California Software Co. Ltd.	96	12
Cauvery Software Engg. Systems Ltd.	96	13
Citicorp Information Technology Inds. Ltd.	96	14
Computech International Ltd.	96	15
D S Q Software Ltd.	96	19
Datasoft Application Software (India) Ltd.	96	20
E D S Technologies Pvt. Ltd.	96	21
Frontier Information Technologies Ltd.	96	91
I C E S Software Ltd.	96	23

Company Name	Year	Code
I E C Softwares Ltd.	96	24
I I S Infotech Ltd.	96	97
Indusa Information Technology Pvt. Ltd.	96	98
Info-Drive Software Ltd.	96	99
Infosys Technologies Ltd.	96	25
Innovation Software Exports Ltd.	96	26
International Computers (India) Ltd.	96	27
K L G Systel Ltd.	96	28
Kirloskar Computer Services Ltd.	96	32
Lan Eseda Inds. Ltd.	96	34
Leading Edge Systems Ltd.	96	36
Lee & Nee Softwares (Exports) Ltd.	96	37
Mahindra-British Telecom Ltd.	96	41
Mangalya Soft-Tech Ltd.	96	42
Mascon Technical Services Ltd.	96	89
Mastek Ltd.	96	43
Microtech Software & Consultants Ltd.	96	44
Midpoint Software & Electro Systems Ltd.	96	95
N I I T Ltd.	96	47
Nucleus Software Exports Ltd.	96	49
Octagon Technology Ltd.	96	51
Omega Interactive Technologies Ltd.	96	52
Orient Information Technology Ltd.	96	54
P S I Data Systems Ltd.	96	55
Pentasoft Technologies Ltd.	96	57
Pentamedia Graphics Ltd.	96	58
Pentonville Software Ltd.	96	59
Polaris Software Lab Ltd.	96	60
R S Software (India) Ltd.	96	61
Radan Multimedia Ltd.	96	100
Ram Informatics Ltd.	96	62
Ravichandra Systems & Computer Services Ltd.	96	63
Satyam Computer Services Ltd.	96	67
Shukla Data Technics Ltd.	96	96
Shyam Software Inds. Ltd.	96	70
Siemens Information Systems Ltd.	96	71
Sierra Optima Ltd.	96	72
Silverline Technologies Ltd.	96	73
S S I Ltd.	96	75
Sonata Software Ltd.	96	76
Svam Softwares Ltd.	96	80
Tata Infotech Ltd.	96	82
Tcil Bellsouth Ltd.	96	83
Twinstar Software Exports Ltd.	96	84
V J I L Consulting Ltd.	96	86
A D A Software & Services Pvt. Ltd.	97	1
A F L Infotech Ltd.	97	94
Ace Software Exports Ltd.	97	2
Advent Computer Services Ltd.	97	4
Aftek Infosys Ltd.	97	5
Aptech Ltd.	97	7
B S E S Telecom Ltd.	97	9
Blue Information Technology Ltd.	97	10
C G-V A K Software & Exports Ltd.	97	11
California Software Co. Ltd.	97	12
Citicorp Information Technology Inds. Ltd.	97	14
Computech International Ltd.	97	15
Cybertech Systems & Software Ltd.	97	18
D S Q Software Ltd.	97	19
Datasoft Application Software (India) Ltd.	97	20
E D S Technologies Pvt. Ltd.	97	21
Frontier Information Technologies Ltd.	97	91
Hexaware Infosystems Ltd.	97	22
I C E S Software Ltd.	97	23
I E C Softwares Ltd.	97	24

Company Name	Year	Code
Infosys Technologies Ltd.	97	25
Innovation Software Exports Ltd.	97	26
International Computers (India) Ltd.	97	27
K L G Systel Ltd.	97	28
Kamal Infosys Pvt. Ltd.	97	31
Kirloskar Computer Services Ltd.	97	32
Leading Edge Systems Ltd.	97	36
Lee & Nee Softwares (Exports) Ltd.	97	37
Maars Software International Ltd.	97	38
Mahindra Applied Systems Technology Ltd.	97	39
Mahindra Network Services Ltd.	97	40
Mahindra-British Telecom Ltd.	97	41
Mangalya Soft-Tech Ltd.	97	42
Mascon Technical Services Ltd.	97	89
Mastek Ltd.	97	43
Microtech Software & Consultants Ltd.	97	44
Midpoint Software & Electro Systems Ltd.	97	95
Motor Industries Software Services Ltd.	97	45
N I I T Ltd.	97	47
Nucleus Software Exports Ltd.	97	49
Octagon Technology Ltd.	97	51
Omega Interactive Technologies Ltd.	97	52
Optech Solutions Pvt. Ltd.	97	53
Orient Information Technology Ltd.	97	54
P S I Data Systems Ltd.	97	55
Pentasoft Technologies Ltd.	97	57
Pentamedia Graphics Ltd.	97	58
Pentonville Software Ltd.	97	59
Polaris Software Lab Ltd.	97	60
R S Software (India) Ltd.	97	61
Ram Informatics Ltd.	97	62
Ravichandra Systems & Computer Services Ltd.	97	63
S R G Infotec Ltd.	97	65
Sanra Computers (India) Ltd.	97	66
Satyam Computer Services Ltd.	97	67
Satyam Enterprise Solutions Ltd.	97	68
Scintilla Software Technology Ltd.	97	93
Shukla Data Technics Ltd.	97	96
Sierra Optima Ltd.	97	72
Silverline Technologies Ltd.	97	73
Softcell Trade & Technologies Ltd.	97	74
S S I Ltd.	97	75
Sonata Software Ltd.	97	76
Soni Infosys Ltd.	97	77
Sundram Numeric Ltd.	97	78
Sundram Telematics Ltd.	97	79
Svam Softwares Ltd.	97	80
Synergy Log-In Systems Ltd.	97	82
Tcil Bellsouth Ltd.	97	83
V J I L Consulting Ltd.	97	86
Visualsoft Technologies Ltd.	97	87
X L Net Software Systems Ltd.	97	88
A D A Software & Services Pvt. Ltd.	98	1
Ace Software Exports Ltd.	98	2
Adam Comsof Ltd.	98	3
Advent Computer Services Ltd.	98	4
Aftek Infosys Ltd.	98	5
Appu Industries Ltd.	98	6
Aptech Ltd.	98	7
B F L Software Ltd.	98	8
B S E S Telecom Ltd.	98	9
Blue Information Technology Ltd.	98	10
C G-V A K Software & Exports Ltd.	98	11
California Software Co. Ltd.	98	12
Cauvery Software Engg. Systems Ltd.	98	13

Company Name	Year	Code
Citicorp Information Technology Inds. Ltd.	98	14
Computech International Ltd.	98	15
Cybermate Infotek Ltd.	98	16
Cyberspace Infosys Ltd.	98	17
Cybertech Systems & Software Ltd.	98	18
D S Q Software Ltd.	98	19
Datasoft Application Software (India) Ltd.	98	20
E D S Technologies Pvt. Ltd.	98	21
Hexaware Infosystems Ltd.	98	22
I C E S Software Ltd.	98	23
I E C Softwares Ltd.	98	24
Infosys Technologies Ltd.	98	25
Innovation Software Exports Ltd.	98	26
International Computers (India) Ltd.	98	27
K L G Systel Ltd.	98	28
K P I T Systems Ltd.	98	29
Kale Consultants Ltd.	98	30
Kamal Infosys Pvt. Ltd.	98	31
Kirloskar Computer Services Ltd.	98	32
L & T Information Technology Ltd.	98	33
Lan Eseda Inds. Ltd.	98	34
Leading Edge Infotech Ltd.	98	35
Leading Edge Systems Ltd.	98	36
Lee & Nee Softwares (Exports) Ltd.	98	37
Maars Software International Ltd.	98	38
Mahindra Applied Systems Technology Ltd.	98	39
Mahindra Network Services Ltd.	98	40
Mahindra-British Telecom Ltd.	98	41
Mangalya Soft-Tech Ltd.	98	42
Mastek Ltd.	98	43
Microtech Software & Consultants Ltd.	98	44
Motor Industries Software Services Ltd.	98	45
N I I T G I S Ltd.	98	46
N I I T Ltd.	98	47
Nexus Software Ltd.	98	48
Nucleus Software Exports Ltd.	98	49
O C L Infomatics Ltd.	98	50
Octagon Technology Ltd.	98	51
Omega Interactive Technologies Ltd.	98	52
Optech Solutions Pvt. Ltd.	98	53
Orient Information Technology Ltd.	98	54
P S I Data Systems Ltd.	98	55
Peerless Technologies Ltd.	98	56
Pentasoft Technologies Ltd.	98	57
Pentamedia Graphics Ltd.	98	58
Pentonville Software Ltd.	98	59
Polaris Software Lab Ltd.	98	60
R S Software (India) Ltd.	98	61
Ram Informatics Ltd.	98	62
Ravichandra Systems & Computer Services Ltd.	98	63
S Q L Star International Ltd.	98	64
S R G Infotec Ltd.	98	65
Sanra Computers (India) Ltd.	98	66
Satyam Computer Services Ltd.	98	67
Satyam Enterprise Solutions Ltd.	98	68
Shri M M Softek Ltd.	98	69
Shyam Software Inds. Ltd.	98	70
Siemens Information Systems Ltd.	98	71
Sierra Optima Ltd.	98	72
Silverline Technologies Ltd.	98	73
Softcell Trade & Technologies Ltd.	98	74
S S I Ltd.	98	75
Sonata Software Ltd.	98	76
Soni Infosys Ltd.	98	77
Sundram Numeric Ltd.	98	78
Sundram Telematics Ltd.	98	79

Company Name	Year	Code
Svam Softwares Ltd.	98	80
Synergy Log-In Systems Ltd.	98	81
Tata Infotech Ltd.	98	82
Tcil Bellsouth Ltd.	98	83
Twinstar Software Exports Ltd.	98	84
Usha Information Systems Ltd.	98	85
V J I L Consulting Ltd.	98	86
Visualsoft Technologies Ltd.	98	87
X L Net Software Systems Ltd.	98	88
Ace Software Exports Ltd.	99	2
Adam Comsof Ltd.	99	3
Aftek Infosys Ltd.	99	5
Appu Industries Ltd.	99	6
Aptech Ltd.	99	7
Mascon Global Ltd.	99	89
B F L Software Ltd.	99	8
B S E L Information Systems Ltd.	99	90
B S E S Telecom Ltd.	99	9
C G-V A K Software & Exports Ltd.	99	11
Cauvery Software Engg. Systems Ltd.	99	13
Computech International Ltd.	99	15
Cybermate Infotek Ltd.	99	16
Cyberspace Infosys Ltd.	99	17
Cybertech Systems & Software Ltd.	99	18
Frontier Information Technologies Ltd.	99	91
I E C Softwares Ltd.	99	24
Infosys Technologies Ltd.	99	25
K L G Systel Ltd.	99	28
K P I T Systems Ltd.	99	29
Kale Consultants Ltd.	99	30
L & T Information Technology Ltd.	99	33
Leading Edge Infotech Ltd.	99	35
Leading Edge Systems Ltd.	99	36
Lee & Nee Softwares (Exports) Ltd.	99	37
Mahindra Applied Systems Technology Ltd.	99	39
Mahindra Information Technology Services Ltd.	99	92
Mahindra Network Services Ltd.	99	40
Mahindra-British Telecom Ltd.	99	41
Mastek Ltd.	99	43
N I I T G I S Ltd.	99	46
N I I T Ltd.	99	47
Nexus Software Ltd.	99	48
Nucleus Software Exports Ltd.	99	49
O C L Infomatics Ltd.	99	50
Omega Interactive Technologies Ltd.	99	52
Orient Information Technology Ltd.	99	54
P S I Data Systems Ltd.	99	55
Peerless Technologies Ltd.	99	56
Pentasoft Technologies Ltd.	99	57
Pentamedia Graphics Ltd.	99	58
Pentonville Software Ltd.	99	59
Polaris Software Lab Ltd.	99	60
Ravichandra Systems & Computer Services Ltd.	99	63
S Q L Star International Ltd.	99	64
Sanra Computers (India) Ltd.	99	66
Satyam Computer Services Ltd.	99	67
Satyam Enterprise Solutions Ltd.	99	68
Scintilla Software Technology Ltd.	99	93
Shri M M Softek Ltd.	99	69
Siemens Information Systems Ltd.	99	71
Sierra Optima Ltd.	99	72
Silverline Technologies Ltd.	99	73
Softcell Trade & Technologies Ltd.	99	74
S S I Ltd.	99	75
Sonata Software Ltd.	99	76
Soni Infosys Ltd.	99	77

Company Name	Year	Code
Sundram Telematics Ltd.	99	79
Synergy Log-In Systems Ltd.	99	81
Tata Infotech Ltd.	99	82
Twinstar Software Exports Ltd.	99	84
Usha Information Systems Ltd.	99	85
V J I L Consulting Ltd.	99	86
Visualsoft Technologies Ltd.	99	87
X L Net Software Systems Ltd.	99	88

Data appendix 4: Firm level data

Sales	GVA	capital	wages	Net export	xport	domestic	Company code	Year
Figures in Rs. lacs(constt. Prices 81-82)								
201.155	81.3282	152.358	10.5871	0	0	201.155	13	92
451.3956	207.411	69.53802	55.34167	-8.18094	180.462	459.5765	25	92
51.97305	5.293551	43.359	3.368624	0	0	51.97305	101	92
584.6968	371.0298	131.6169	26.46776	363.8114	416.7469	220.8855	34	92
219.4418	109.7209	37.3436	39.46102	132.82	222.3292	86.62175	41	92
222.3292	140.0385	36.76612	66.41001	33.205	51.01059	189.1242	43	92
1040.905	274.7834	529.8364	139.5573	288.7392	639.5573	752.1655	55	92
3173.244	1503.369	884.6006	391.7228	757.4591	1989.413	2415.784	82	92
829.4709	244.8623	563.6642	11.80586	0	0	829.4709	13	93
9.182335	1.311762	2.7547	0.437254	0	0	9.182335	20	93
36.29209	4.37254	21.73153	8.307827	2.623524	3.060778	33.66856	97	93
617.84	317.4464	83.42807	111.937	260.1662	475.7324	357.6738	25	93
155.6624	143.8566	39.52777	47.22344	38.91561	41.10188	116.7468	32	93
99.69392	1.749016	88.15042	5.247049	0	0	99.69392	101	93
1213.817	633.5811	566.244	26.23524	303.4543	313.9484	910.3629	34	93
464.3638	219.0643	38.12855	41.10188	245.2995	466.9873	219.0643	41	93
441.1893	226.0603	119.6764	95.75864	39.79012	118.4958	401.3992	43	93
1914.735	1229.996	426.8911	297.77	17.49016	135.1115	1897.245	47	93
773.9397	246.6113	185.0459	163.533	381.2855	665.9379	392.6541	55	93
194.1408	131.1762	12.46174	72.14692	72.58417	192.3918	121.5566	61	93
22.29996	7.870573	11.23743	3.935286	0	0	22.29996	64	93
11.36861	14.86664	0.874508	0	0	0	11.36861	65	93
487.5383	55.09401	435.024	23.17446	-113.249	401.8365	600.7871	73	93
59.46655	29.73328	23.61172	8.745081	-6.12156	0	65.58811	80	93
3982.073	1746.83	1071.229	456.056	910.3629	2622.213	3071.71	82	93
125.908	29.86279	86.19855	8.878128	0	0	125.908	5	94
90.79903	41.96933	23.12349	0.403551	0	0	90.79903	6	94
39.14447	22.59887	6.860371	8.071025	0.807103	37.53027	38.33737	8	94
966.5052	243.745	729.4189	10.08878	-0.40355	0	966.9088	13	94
857.95	557.7078	206.9814	170.7022	343.4221	623.0831	514.5278	14	94
4.035513	3.631961	0.121065	0.403551	0	0	4.035513	17	94
799.0315	389.8305	369.4915	89.58838	395.8838	779.2575	403.1477	19	94
23.80952	7.667474	5.004036	3.22841	0.403551	0.403551	23.40597	20	94
77.88539	66.58596	25.50444	9.68523	6.860371	8.878128	71.02502	91	94
183.6158	55.28652	117.6352	14.12429	30.26634	32.68765	153.3495	97	94
12.51009	11.29944	0.726392	2.421308	0	0	12.51009	99	94
1169.088	796.2066	307.9096	387.4092	505.6497	1005.65	663.4383	25	94
268.3616	266.3438	0.201776	223.9709	268.3616	268.3616	0	27	94
247.7805	152.9459	125.8676	53.67232	7.667474	13.31719	240.113	32	94
28.65214	-17.7563	16.34383	2.017756	0	0	28.65214	101	94
1400.323	588.7813	794.2292	23.00242	-3.63196	1.210654	1403.955	34	94
12.10654	6.053269	2.340597	2.421308	-4.43906	0	16.5456	37	94
593.2203	286.5214	52.01776	77.88539	279.2575	558.9185	313.9629	41	94
10.08878	6.053269	4.88297	2.824859	0	0	10.08878	95	94
2493.14	1435.028	638.2567	351.8967	-16.9492	264.3261	2510.089	47	94
718.3212	535.9161	129.1768	277.2397	292.1711	554.0759	426.1501	55	94
1283.697	403.9548	795.9645	19.37046	-64.5682	208.636	1348.265	58	94
419.2897	305.8918	60.33091	207.8289	137.611	419.2897	281.6788	61	94
58.51493	18.15981	44.18886	10.08878	20.58111	52.46166	37.93382	64	94
17.75626	15.33495	3.833737	2.017756	0	0	17.75626	65	94
304.6812	253.4302	18.44229	88.37772	272.3971	304.6812	32.2841	67	94
14.12429	11.29944	2.542373	0.403551	0	0	14.12429	96	94
836.9653	290.1533	441.3236	45.19774	409.6045	808.7167	427.3608	71	94
1235.674	359.9677	827.4818	22.19532	352.3002	1156.981	883.3737	73	94

163.4383	54.07587	83.29298	19.37046	-7.26392	0.807103	170.7022	80	94
112.9944	100.0807	25.26231	12.91364	0	0	112.9944	81	94
4795.803	1686.037	1624.132	577.8854	1077.885	3106.538	3717.918	82	94
15.7385	6.860371	8.071025	4.035513	14.52785	15.33495	1.210654	86	94
22.20604	11.64907	2.548234	7.28067	22.20604	22.20604	0	1	95
13.83327	-6.5526	11.86749	15.28941	-2.1842	0.364033	16.01747	3	95
188.9334	40.77175	140.881	10.921	0	0	188.9334	5	95
194.7579	66.61813	57.26247	0.364033	0	0	194.7579	6	95
18.92974	2.548234	12.66837	2.184201	0	0	18.92974	7	95
459.4103	252.6392	148.3436	38.22352	323.2617	375.6826	136.1485	8	95
1637.787	627.9578	1033.928	12.37714	-1.0921	0	1638.879	13	95
941.7546	486.3487	310.4842	201.3105	617.7648	744.4485	323.9898	14	95
117.5828	71.7146	36.03932	21.84201	13.46924	18.56571	104.1136	15	95
40.04368	32.76301	4.659629	2.184201	0	0	40.04368	17	95
1507.463	768.1107	427.5209	141.245	215.1438	877.3207	1292.319	19	95
17.83764	12.74117	4.623225	3.276301	0	0	17.83764	20	95
48.41645	40.04368	16.41791	6.188569	0	0	48.41645	91	95
8.37277	4.004368	1.310521	0.728067	0	0	8.37277	24	95
820.5315	346.5599	352.7849	64.43393	411.3578	545.6862	409.1736	97	95
9.464871	4.732435	2.657444	0.364033	5.096469	6.916636	4.368402	98	95
13.10521	10.55697	0.76447	2.548234	0	0	13.10521	99	95
2017.474	1542.046	532.3262	808.5184	743.7204	1675.282	1273.753	25	95
37.85948	10.55697	5.460502	3.640335	-10.1929	0	48.05242	26	95
222.7885	159.8107	29.01347	152.53	157.9905	201.3105	64.79796	27	95
109.9381	40.77175	55.33309	3.640335	-44.7761	0	154.7142	28	95
327.9942	120.1311	206.953	56.42519	20.38588	24.02621	307.6083	32	95
3457.59	752.0932	2676.301	27.66655	-7.6447	12.37714	3465.235	34	95
381.1431	280.6698	64.25191	187.4772	104.8416	355.6607	276.3014	36	95
68.4383	24.75428	42.11867	3.276301	-11.6491	3.640335	80.08737	37	95
903.1671	438.2963	44.04805	127.4117	357.1169	887.1496	546.0502	41	95
16.01747	9.828904	6.297779	4.004368	-0.36403	0	16.38151	42	95
81.5435	41.13578	12.92319	16.38151	-6.91664	48.78049	88.46014	89	95
706.589	376.4106	216.8548	156.1704	-10.557	176.5562	717.146	43	95
69.16636	15.28941	50.92829	8.37277	0	0	69.16636	44	95
44.04805	22.93411	29.01347	3.276301	5.824536	7.28067	38.22352	95	95
3289.407	1885.693	857.5901	486.3487	336.3669	748.0888	2953.04	47	95
51.32872	38.58755	3.822352	5.460502	43.68402	51.32872	7.644703	49	95
45.50419	36.76738	3.167091	3.276301	0	0	45.50419	52	95
3.276301	1.820167	-0.0364	1.0921	0.728067	0.728067	2.548234	54	95
491.0812	379.6869	65.2712	284.3102	139.4248	400.8009	351.6564	55	95
2166.363	1349.472	722.0968	645.0673	193.3018	741.9003	1973.062	58	95
14.56134	-9.10084	14.70695	10.19294	3.276301	3.276301	11.28504	59	95
67.3462	51.69276	9.428467	15.65344	32.76301	61.52166	34.58318	60	95
418.6385	322.1696	44.73972	230.4332	140.1529	418.6385	278.4856	61	95
93.19257	82.6356	12.59556	4.368402	16.01747	0	77.1751	100	95
512.1951	224.2446	246.9967	12.74117	0	0	512.1951	65	95
878.0488	717.51	46.92392	281.3979	799.4175	877.3207	78.63123	67	95
79.3593	55.33309	21.40517	2.184201	15.28941	15.28941	64.06989	96	95
1532.217	519.8398	900.8737	79.72333	207.1351	839.0972	1325.082	71	95
19.65781	14.56134	2.548234	3.640335	0	0	19.65781	72	95
2005.461	730.6152	1249.836	62.24973	604.6596	1895.886	1400.801	73	95
37.13142	25.11831	10.15653	4.732435	0	0	37.13142	75	95
12.01311	9.828904	2.293411	0.364033	0	0	12.01311	77	95
267.5646	105.5697	147.3244	17.83764	2.548234	12.37714	265.0164	80	95
201.6746	168.1835	43.28358	19.29378	-1.0921	5.460502	202.7667	81	95
4921.733	1855.843	1529.086	720.0582	1272.297	3266.837	3649.436	82	95
112.1223	29.85075	16.56352	16.38151	38.58755	88.0961	73.53477	83	95
24.02621	21.84201	10.95741	6.188569	-17.4736	23.66218	41.49982	86	95

28.39757	18.93171	1.690331	11.83232	27.72143	28.39757	0.676133	1	96
15.55105	14.87492	1.014199	2.366464	15.55105	15.55105	0	94	96
40.56795	21.63624	29.41176	3.042596	27.72143	37.18729	12.84652	2	96
37.86342	37.86342	5.747126	5.070994	0	0	37.86342	3	96
455.3753	164.6383	164.9763	0.676133	0	0	455.3753	6	96
2425.625	525.0169	1688.979	118.3232	4.394861	9.127789	2421.231	7	96
620.6897	485.4632	35.83502	142.664	415.4834	564.9087	205.2062	8	96
137.2549	102.096	16.22718	25.0169	-89.9256	0	227.1805	12	96
2778.229	626.4368	2405.341	0.676133	0	0	2778.229	13	96
1203.516	758.9588	210.2772	274.1717	759.2968	1029.75	444.2191	14	96
478.0257	274.1717	196.4165	31.44016	235.6322	277.5524	242.3935	15	96
1938.81	1042.934	564.9087	284.6518	477.3496	938.1339	1461.46	19	96
5.40906	3.042596	6.761325	4.056795	0	0.338066	5.40906	20	96
38.53955	-2.70453	31.44016	5.070994	0	0	38.53955	21	96
65.24679	55.78093	21.29817	8.11359	5.747126	7.437458	59.49966	91	96
177.1467	126.4368	19.94591	9.127789	46.99121	131.5078	130.1555	23	96
55.78093	20.96011	12.84652	9.127789	0	0	55.78093	24	96
885.0575	369.1684	413.7931	94.32049	440.1623	642.664	444.8952	97	96
7.437458	5.070994	1.352265	0.676133	7.099391	7.099391	0.338066	98	96
12.84652	8.11359	6.085193	4.732928	0	0	12.84652	99	96
3007.776	2408.046	812.3732	1163.286	1390.128	2517.241	1617.647	25	96
34.14469	10.14199	5.747126	8.789723	2.366464	3.380663	31.77823	26	96
226.8425	104.4625	13.52265	88.91143	147.0588	225.4902	79.78364	27	96
186.9506	78.76944	84.1785	13.86072	-36.1731	19.94591	223.1237	28	96
417.8499	137.931	259.973	61.52806	62.20419	71.67005	355.6457	32	96
4107.505	840.7708	3566.261	2.366464	-216.7	0	4324.206	34	96
555.1048	444.8952	68.96552	328.6004	129.1413	548.0054	425.9635	36	96
73.02231	-9.46586	7.775524	3.718729	55.78093	70.65585	17.24138	37	96
1128.127	361.7309	90.60176	226.1663	383.7052	1114.943	744.4219	41	96
28.0595	24.67884	12.50845	6.085193	2.028398	2.028398	26.0311	42	96
133.5362	58.48546	41.58215	21.97431	93.64435	127.789	39.89182	89	96
730.8993	422.5828	199.121	181.5416	69.30358	222.4476	661.5957	43	96
443.5429	33.80663	383.0291	15.21298	0	0	443.5429	44	96
46.99121	27.72143	47.32928	7.437458	-1.35227	0	48.34348	95	96
5052.738	2878.296	1440.162	865.4496	424.6112	1155.51	4628.127	47	96
129.4794	85.53076	12.17039	21.63624	86.54496	98.37728	42.93442	49	96
0.338066	-2.0284	. 0	0	0	0	0.338066	51	96
36.84922	27.72143	7.775524	6.085193	0	0	36.84922	52	96
74.37458	70.99391	5.40906	52.0622	17.24138	68.62745	57.1332	54	96
701.1494	460.1082	161.2576	402.975	129.4794	506.7613	571.67	55	96
204.192	55.1048	159.9053	1.014199	-2.0284	0	206.2204	57	96
3809.669	2700.473	1029.412	1265.72	429.3442	1382.353	3380.325	58	96
8.11359	5.40906	4.394861	10.14199	6.085193	6.085193	2.028398	59	96
209.6011	142.3259	38.53955	51.72414	82.1501	163.9621	127.451	60	96
569.6416	404.6653	119.3374	280.595	205.8824	569.6416	363.7593	61	96
113.2522	100.0676	17.24138	6.085193	-1.35227	0	114.6045	100	96
29.0737	22.98851	11.49425	6.423259	-7.77552	2.70453	36.84922	62	96
69.97972	31.44016	35.15889	3.042596	0	0	69.97972	63	96
1756.93	1378.972	127.1129	614.6045	911.7647	1756.93	845.1657	67	96
79.10751	34.82082	48.00541	3.042596	2.028398	3.042596	77.07911	96	96
4.394861	2.70453	0.676133	0.676133	0	0	4.394861	70	96
2070.318	649.0872	1186.613	175.7945	394.8614	1240.027	1675.456	71	96
72.68425	53.75254	14.53685	14.19878	38.87762	55.44287	33.80663	72	96
2910.074	971.2644	2030.764	92.63016	296.4841	2787.694	2613.59	73	96
89.92563	93.98242	-4.39486	12.50845	0	0	89.92563	75	96
1831.305	464.165	1102.434	170.0473	-665.652	382.0149	2496.957	76	96
378.9723	85.53076	287.6944	23.66464	-31.1021	0	410.0744	80	96
5841.109	2295.132	1948.952	864.0974	1418.864	3652.13	4422.245	82	96

93.98242	3.380663	34.14469	16.22718	29.74983	69.64165	64.23259	83	96
54.0906	35.83502	30.76403	10.81812	-12.5085	0	66.59905	86	96
37.19008	26.70057	2.542912	15.57533	25.74698	26.38271	11.4431	1	97
27.3363	22.25048	5.085823	5.721551	27.01844	27.3363	0.317864	94	97
52.44755	32.73999	24.79339	4.767959	0	0	52.44755	2	97
198.665	123.3312	35.91863	9.218055	0	0	198.665	4	97
311.1888	105.8487	212.3331	11.76097	-1.27146	0	312.4603	5	97
5181.5	1367.769	3324.857	294.0242	11.4431	20.97902	5170.057	7	97
28.92562	3.17864	24.47552	1.907184	0	0	28.92562	9	97
9.535919	6.993007	3.814367	3.814367	0	0	9.535919	10	97
55.62619	31.15067	19.70757	20.97902	26.38271	34.96503	29.24348	11	97
165.6071	109.0273	18.75397	25.42912	89.9555	165.6071	75.65162	12	97
1695.804	1149.078	200.89	340.1144	1148.76	1534.647	547.0439	14	97
799.4278	563.5728	947.2346	57.21551	-461.856	232.9943	1261.284	15	97
235.2193	199.9364	18.75397	15.25747	228.862	234.9015	6.357279	18	97
2031.469	1229.498	248.5696	373.1723	1310.553	1585.505	720.9154	19	97
8.900191	3.814367	5.085823	3.17864	3.17864	3.17864	5.721551	20	97
276.5416	29.87921	219.0083	11.4431	0	0	276.5416	21	97
65.16211	50.2225	10.80737	13.03242	3.17864	3.17864	61.98347	91	97
617.9275	164.9714	335.9822	107.438	55.30833	175.7788	562.6192	22	97
310.2352	206.6116	100.445	55.94406	228.862	310.2352	81.37317	23	97
146.2174	30.51494	90.27336	10.80737	0	0	146.2174	24	97
4456.771	3362.683	1165.289	1641.132	1838.843	3624.603	2617.928	25	97
18.75397	6.039415	6.039415	5.721551	-0.31786	0	19.07184	26	97
964.0814	766.0521	99.49142	352.1933	774.9523	954.8633	189.1291	27	97
197.7114	60.07629	110.9345	21.61475	-89.0019	3.814367	286.7133	28	97
2.860776	0	0.953592	0.953592	0	0	2.860776	31	97
640.4959	148.1246	448.8239	61.66561	-148.125	62.30134	788.6205	32	97
1064.844	918.6268	117.2918	616.3382	301.6529	1043.547	763.1914	36	97
0.953592	-20.6612	20.02543	2.225048	0	0.953592	0.953592	37	97
219.644	189.4469	9.218055	116.9739	45.13668	56.26192	174.5073	38	97
131.5957	71.51939	55.62619	38.46154	0	0	131.5957	39	97
13.98601	-11.4431	15.57533	12.39669	-34.3293	9.218055	48.31532	40	97
1932.931	914.8125	86.459	272.0915	989.5105	1974.253	943.4202	41	97
12.07883	1.58932	13.98601	0.635728	0	0	12.07883	42	97
126.5099	41.64018	36.87222	16.84679	101.0807	155.4355	25.42912	89	97
917.3554	549.9046	205.9758	248.8875	266.0521	415.4482	651.3032	43	97
1134.139	56.26192	1018.754	34.64717	0	0	1134.139	44	97
20.66116	-16.5289	2.860776	5.721551	0	0	20.66116	95	97
160.2034	155.7533	0	131.9135	0	0	160.2034	45	97
7202.479	4375.397	1863.318	1229.498	857.9148	1755.245	6344.565	47	97
148.1246	57.21551	77.5588	21.29688	10.48951	145.5817	137.6351	49	97
7.310871	6.039415	0.953592	3.496503	-0.95359	0	8.264463	51	97
19.70757	13.03242	1.907184	4.767959	-0.63573	0	20.34329	52	97
11.76097	1.58932	0.953592	2.225048	6.357279	11.76097	5.403687	53	97
204.0687	187.8576	10.17165	138.9065	50.2225	194.2149	153.8462	54	97
499.3643	286.0776	114.431	303.8779	63.57279	386.8404	435.7915	55	97
599.1736	153.5283	486.3318	13.35029	14.30388	33.69358	584.8697	57	97
5410.362	4690.083	731.0871	2415.448	-246.98	2503.179	5657.343	58	97
11.76097	6.357279	4.132231	9.853783	4.450095	4.767959	7.310871	59	97
479.021	283.2168	116.0203	157.3427	172.918	401.1443	306.103	60	97
761.2842	601.7165	120.1526	477.7495	238.0801	743.8017	523.2041	61	97
79.14812	39.73299	44.18309	13.03242	6.039415	6.357279	73.10871	62	97
42.27591	21.93261	15.8932	3.814367	5.403687	6.357279	36.87222	63	97
952.9561	300.3814	677.686	46.09027	-1.58932	0	954.5455	65	97
5.721551	2.542912	1.58932	7.628735	0	0	5.721551	66	97
2837.254	2220.598	234.9015	1066.434	1381.755	2574.38	1455.499	67	97
162.4285	33.69358	86.77686	24.47552	-39.0973	0	201.5257	68	97

2632.867	563.2549	2183.725	0	0	0	2632.867	93	97
56.57978	45.13668	26.06484	1.907184	0	0	56.57978	96	97
144.946	105.8487	21.61475	40.05086	64.20852	102.9879	80.73744	72	97
2467.578	1095.677	1332.168	181.5003	857.9148	2288.62	1609.663	73	97
280.6739	18.43611	303.5601	6.675143	0	0	280.6739	74	97
422.1233	262.8735	105.8487	35.2829	0	0	422.1233	75	97
1670.693	419.2626	805.7851	201.5257	-277.813	527.972	1948.506	76	97
39.41513	19.3897	18.75397	0.953592	0	0	39.41513	77	97
28.92562	21.29688	4.767959	10.80737	28.60776	28.92562	0.317864	78	97
68.97648	57.21551	5.085823	14.62174	68.97648	68.97648	0	79	97
404.9587	71.20153	336.3001	21.61475	-50.5404	0	455.499	80	97
366.4971	297.2028	91.54482	45.13668	-2.54291	24.47552	369.0401	81	97
6646.217	2342.657	2000.636	1119.199	1309.282	3957.088	5336.936	82	97
145.8996	89.63764	7.310871	20.66116	92.18055	111.2524	53.71901	83	97
88.36618	57.21551	22.8862	20.02543	0	0	88.36618	86	97
56.89765	53.40114	5.721551	35.91863	17.80038	56.89765	39.09727	87	97
25.11125	21.93261	1.907184	13.35029	0	0	25.11125	88	97
39.72104	28.50212	2.728927	16.67677	0	0	39.72104	1	98
67.01031	41.23711	41.23711	9.096422	0	0	67.01031	2	98
148.5749	40.9339	91.26743	3.335355	-26.9861	0	175.5609	3	98
39.41783	15.1607	36.6889	3.638569	0	0	39.41783	4	98
234.3845	64.5846	157.9745	11.52213	-2.72893	0	237.1134	5	98
588.8417	210.7338	204.6695	0.606428	0	0	588.8417	6	98
6119.466	1777.441	4071.862	389.6301	7.277138	25.46998	6112.189	7	98
852.638	529.715	337.174	333.8387	552.1528	864.4633	300.4851	8	98
98.84779	30.32141	42.75318	12.12856	0	0	98.84779	9	98
1675.864	924.4997	767.1316	52.45603	0	0	1675.864	10	98
104.0024	57.30746	33.35355	29.71498	17.58642	46.99818	86.41601	11	98
142.2074	74.89388	21.22498	28.50212	32.44391	144.3299	109.7635	12	98
3708.005	860.8247	2858.096	0	0	0	3708.005	13	98
2356.58	1753.79	228.3202	604.6089	1670.103	2206.792	686.4767	14	98
1693.147	759.248	1088.235	74.28745	-307.459	413.8872	2000.606	15	98
26.98605	26.68284	-14.8575	10.91571	0.909642	2.122498	26.07641	16	98
69.13281	63.97817	11.82535	1.51607	0	0	69.13281	17	98
369.3147	302.9109	31.83748	48.81747	360.5215	366.2826	8.793208	18	98
3540.934	1866.283	1575.197	616.4342	1438.751	3305.337	2102.183	19	98
10.61249	3.941783	2.122498	3.032141	4.851425	4.851425	5.761067	20	98
291.9951	37.29533	225.2881	23.04427	0	0	291.9951	21	98
674.9545	204.3663	383.5658	114.0085	35.77926	219.8302	639.1753	22	98
157.9745	1.212856	61.24924	100.3639	110.3699	115.5246	47.60461	23	98
164.342	42.44997	96.72529	14.85749	0	0	164.342	24	98
7843.238	5700.121	2193.451	2842.025	3862.644	6853.851	3980.594	25	98
18.19284	5.154639	6.064281	2.728927	-0.60643	0	18.79927	26	98
1514.251	1276.531	174.0449	623.4081	1311.704	1505.155	202.547	27	98
244.3905	80.35173	140.6913	29.41176	-109.46	1.819284	353.8508	28	98
371.4372	121.2856	220.1334	40.9339	20.31534	275.3184	351.1219	29	98
381.1401	240.1455	86.1128	113.4021	215.8884	229.8363	165.2517	30	98
8.18678	6.064281	2.122498	1.819284	0	0	8.18678	31	98
930.2608	228.6234	641.2978	80.35173	71.25531	104.6089	859.0055	32	98
2760.461	1933.596	150.6974	1184.961	-1068.53	0	3828.987	33	98
4397.21	491.51	3967.859	2.728927	0	0	4397.21	34	98
45.48211	34.86962	6.973924	26.68284	0	0	45.48211	35	98
1422.377	1208.914	229.5331	749.5452	329.2905	1422.377	1093.087	36	98
15.1607	6.064281	3.941783	1.819284	-0.90964	0	16.07035	37	98
500	462.7047	13.34142	316.5555	40.63069	50.03032	459.3693	38	98
257.4287	186.7799	48.81747	94.29958	-1.81928	0	259.248	39	98
31.83748	-26.0764	20.01213	29.41176	10.00606	23.04427	21.83141	40	98
2889.63	1583.081	189.2056	501.5161	1700.728	2994.845	1188.902	41	98

21.83141	[illegible]	19.10249	1.212856	0	0	21.83141	[illegible]2	98
952.3954	637.[illegible]2	143.117	345.3608	657.0649	755.3062	295.3305	43	98
1038.508	91.87386	899.3329	50.03032	0	0	1038.508	4[illegible]	98
314.433	307.4591	0	284.1116	0	0	314.433	45	98
139.4785	56.70103	81.8678	16.37356	-14.8575	0	154.336	46	98
9870.831	5619.77	3271.073	1465.434	1587.326	2339.297	8283.505	47	98
3.941783	-4.54821	1.51607	0.909642	0	0	3.941783	48	98
167.6774	53.9721	84.29351	33.35355	75.19709	144.3299	92.48029	49	98
15.76713	11.52213	1.212856	6.367495	0	0	15.76713	50	98
20.01213	10.61249	4.548211	6.367495	0	0	20.01213	51	98
13.0382	6.67071	1.51607	3.335355	-0.30321	0	13.34142	52	98
156.4585	124.0146	9.096422	19.10249	0	0	156.4585	53	98
369.9212	344.148	21.5282	247.4227	115.2213	355.9733	254.6998	54	98
946.9375	641.601	199.5149	499.6968	246.8163	755.9127	700.1213	55	98
13.0382	-2.72893	12.12856	3.335355	1.212856	1.212856	11.82535	56	98
124[illegible]449	332.6258	928.1383	25.46998	-33.0503	57.61067	1273.499	57	98
8628.26	5143.723	4601.577	1062.765	2750.152	6847.483	5878.108	58	98
11.52213	15.1607	3.941783	8.489994	1.51607	1.51607	10.00606	59	98
934.2025	587.6289	297.453	407.8229	286.5373	756.8223	647.6653	60	98
818.3748	673.7417	124.9242	508.7932	283.5052	792.6016	534.8696	61	98
95.51243	56.0946	34.26319	18.79927	5.154639	9.096422	90.35779	62	98
92.17708	28.50212	62.4621	4.244997	3.032141	3.032141	89.14494	63	98
563.3717	206.792	263.493	90.05458	130.0788	352.9412	433.2929	64	98
136.7495	125.2274	70.95209	14.85749	0	0	136.7495	65	98
34.26319	28.50212	3.032141	8.18678	0	0	34.26319	66	98
5412.068	4280.17	740.752	2246.21	2056.095	4851.122	3355.973	67	98
348.9994	166.7677	133.7174	90.66101	41.54033	63.97817	307.4591	68	98
28.19891	20.92177	6.064281	7.883566	0	0	28.19891	69	98
8.18678	3.032141	2.122498	3.335355	0	0	8.18678	70	98
4431.17	1573.075	2242.874	543.3596	1728.017	2677.38	2703.153	71	98
276.228	218.6173	36.08247	122.1953	150.3942	237.1134	125.8338	72	98
2538.205	1402.365	1134.324	313.5233	1392.965	2361.734	1145.24	73	98
627.3499	54.27532	541.2371	24.25713	-1.81928	0	629.1692	74	98
700.7277	442.9958	160.4002	84.89994	-9.70285	0	710.4306	75	98
2566.707	593.0867	1801.395	271.6798	-631.898	1078.532	3198.605	76	98
14.25106	9.399636	3.638569	0.909642	0	0	14.25106	77	98
2.122498	1.51607	0	1.212856	0	0	2.122498	78	98
62.15888	48.21104	5.457853	15.1607	58.82353	62.15888	3.335355	79	98
411.4615	61.55246	348.6962	21.5282	-13.9478	6.367495	425.4093	80	98
285.9309	234.3845	93.38993	37.90176	58.82353	85.50637	227.1073	81	98
9888.114	3528.199	3863.25	1602.79	2658.581	6264.403	7229.533	82	98
153.7295	54.88175	5.761067	26.98605	122.1953	171.9224	31.53426	83	98
66.7071	35.47605	23.34748	9.70285	-0.90964	0	67.61674	84	98
4.244997	4.244997	2.425713	1.212856	0	0	4.244997	85	98
221.0431	144.9363	50.33354	73.07459	0	0	221.0431	86	98
288.3566	286.8405	14.85749	180.1092	102.7896	285.9309	185.567	87	98
14.55428	11.82535	1.819284	12.73499	0	0	14.55428	88	98
72.0363	35.16733	34.0329	8.224617	0	0	72.0363	2	99
252.9779	30.346	190.5842	2.552467	0	0	252.9779	3	99
262.0533	89.90357	169.8809	14.46398	-0.85082	0	262.9041	5	99
475.8934	155.7005	231.9909	0.567215	0	0	475.8934	6	99
7874.929	2279.353	5392.513	456.8917	-0.56721	112.3086	7875.496	7	99
99.26262	82.52978	14.74759	58.99036	91.32161	96.14294	7.94101	89	99
2774.248	2059.841	370.3914	1002.269	1940.442	2798.922	833.806	8	99
210.4368	185.1957	16.44923	9.07544	65.79694	66.08054	144.6398	90	99
100.1134	36.01815	9.926262	16.44923	-0.56721	0	100.6807	9	99
114.2938	79.4101	23.82303	45.3772	40.83948	87.91832	73.45434	11	99
190.8678	2.26886	183.494	0	0	0	190.8678	13	99

2625.355	894.2144	1515.598	57.85593	628.4742	1234.827	1996.88	15	99
77.99206	53.31821	8.508225	23.82303	8.791832	13.32955	69.20023	16	99
85.64946	91.038	10.20987	1.13443	0	0	85.64946	17	99
538.287	477.3114	51.90017	77.99206	367.5553	541.9739	170.7317	18	99
82.52978	57.85593	20.70335	14.18037	0	0	82.52978	91	99
196.2564	62.96086	114.5774	17.58366	-1.41804	0	197.6744	24	99
14432.5	10566.36	3838.911	4709.586	8018.434	13479.58	6414.067	25	99
328.1339	119.966	168.4628	43.10834	-123.086	2.836075	451.2195	28	99
442.1441	191.1514	268.5763	72.88712	49.0641	300.6239	393.08	29	99
607.7708	440.1588	101.5315	230.8565	431.6506	461.1458	176.1202	30	99
4575.723	3369.541	303.7436	1898.185	-1799.77	0	6375.496	33	99
28.36075	21.83778	4.53772	25.52467	0	0	28.36075	35	99
1800.057	1482.133	351.1061	918.0374	463.9818	1800.057	1336.075	36	99
173.5678	57.57232	104.9348	1.418037	40.83948	138.4005	132.7283	37	99
413.2161	309.6994	45.3772	153.7153	3.686897	26.94271	409.5292	39	99
5.67215	20.41974	0	0	0	0	5.67215	92	99
7.090187	-34.3165	44.52638	34.60011	0.567215	3.40329	6.522972	40	99
4872.66	2801.191	312.8191	985.536	3146.909	4944.129	1725.752	41	99
978.7294	634.7136	167.8956	418.0374	720.363	869.5406	258.3664	43	99
256.0976	93.02326	151.73	7.657402	-76.574	14.46398	332.6716	46	99
12753.26	6975.893	4969.37	1639.818	3066.931	3704.481	9686.33	47	99
11.06069	2.836075	3.119682	2.552467	0	0	11.06069	48	99
145.7742	54.73625	62.67725	38.28701	74.30516	112.025	71.46909	49	99
13.32955	7.94101	1.418037	3.970505	0.567215	0.567215	12.76234	50	99
23.53942	14.74759	1.13443	5.104935	5.388542	5.67215	18.15088	52	99
712.9892	667.3284	37.7198	498.0147	136.1316	698.5252	576.8576	54	99
1144.073	813.6699	258.0828	555.8707	400.4538	901.3046	743.6188	55	99
13.32955	-10.2099	19.28531	3.40329	6.522972	6.522972	6.80658	56	99
1982.7	781.9058	1238.798	52.46739	661.6563	676.4039	1321.044	57	99
14914.07	8085.366	8503.687	1770.562	5687.465	14515.88	9226.602	58	99
5.104935	5.388542	2.552467	4.821327	0	0	5.104935	59	99
1708.735	1298.071	336.0749	814.5207	702.4957	1469.087	1006.239	60	99
94.44129	40.83948	54.45264	10.77708	0	0	94.44129	63	99
539.705	230.5729	243.3352	83.94782	115.4282	296.937	424.2768	64	99
26.6591	15.59841	1.701645	3.119682	0	0	26.6591	66	99
10724.05	8534.317	1363.868	4106.353	3615.712	9125.355	7108.338	67	99
1080.545	482.9836	405.8423	224.0499	180.658	309.1322	899.8866	68	99
2408.678	543.1083	2174.702	0	0	0	2408.678	93	99
66.93137	50.76574	10.77708	20.70335	18.43449	18.43449	48.49688	69	99
3901.021	1948.667	1768.293	959.1605	1432.218	2435.337	2468.803	71	99
430.5162	310.5502	77.14124	157.6858	268.5763	383.1537	161.9399	72	99
3132.161	2039.989	1142.371	461.1458	1983.267	2947.533	1148.894	73	99
998.0147	69.20023	889.6767	33.74929	-11.6279	0	1009.643	74	99
1188.032	756.3812	284.4583	147.7595	3.40329	24.10664	1184.628	75	99
3566.931	1030.913	2195.122	484.9688	168.7465	1772.263	3398.185	76	99
15.0312	15.88202	3.119682	0.850822	15.0312	15.0312	0	77	99
12.76234	1.418037	5.104935	9.642655	10.77708	12.76234	1.985252	79	99
266.8746	236.245	76.29041	55.30346	93.87408	110.6069	173.0006	81	99
11145.77	4632.161	3745.037	2255.53	4217.527	7560.976	6928.247	82	99
121.384	91.038	65.51333	11.62791	31.48043	35.16733	89.90357	84	99
2.26886	1.701645	1.418037	0	0	0	2.26886	85	99
326.1486	195.6892	68.63301	108.3381	0	0	326.1486	86	99
862.1668	763.4714	105.2184	379.7504	471.9229	859.8979	390.2439	87	99
14.46398	12.19512	1.13443	8.224617	0	0	14.46398	88	99

Source: CMIE; PROWESS database.

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