

## Research Article

# Globalization and Relative Compensation in India's Information Technology Sector

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### **Abstract**

*This article evaluates the relationship between foreign earnings and wage share for a large number of information technology-sector firms in India over a recent six-year period. The results that are established, after accounting for the fact that exporting is an endogenous phenomenon, show that the foreign earnings and wage share relationship is positive and significant for Indian firms during the entire period of analysis. In general, there has been disquiet that the gains from growth are not shared with employees, and that other firm stakeholders appropriate these gains. The firms that are actively engaged in the global information technology economy have, in part, been cognizant of providing higher rewards to their key human capital resources, and the consequences of globalization have been positive for the employees of Indian information technology firms.*

## **1. Introduction**

This article examines the relationship, for several hundred key Indian information technology firms, between exporting behavior and the proportion of a firm's product that is distributed among employees as the wage share. The article is sited at the confluence of four important phenomena. First, India has been an emerging economy, and it is now rapidly becoming one of the world's key economic powerhouses. Second, India, along with many emerging economies, has been prescribed the export-led growth strategy that many other Asian countries have successfully adopted. Third, the Indian information technology and software industry has been a global player since its inception, and in the last decade and a half, it has become an important contributor to India's growth statistics. Fourth, we know little about what happens with developing country service sector wages in general, and even less about wages in information technology sector firms in India.

The issue of whether Indian information technology and software firms' global engagement has led the employees of these firms to benefit, via relatively higher wages, is both extremely important and an issue on which we know nothing. If, indeed, as is commonly the case with recent evidence from broader emerging economies, the evidence on this issue is mixed, it will raise the distributional question of which stakeholders benefit from Indian information technology and software firms' overseas market engagements.

Conceptually, too, in an endogenous growth model, where employee-embedded and firm-level-specific capabilities drive performance, the impact that the process of globalization of Indian information technology

firms has had on their wage share is an important issue defining the future trajectory of India's industrial and economic evolution, particularly given the importance placed on India's information technology sector.

The wage share is an extremely important economic performance indicator, and there has been considerable debate around the world that rising economic growth, both for countries in general and for the firms that operate in these countries, has not resulted in an increase in the wage share. Take a few examples: China's growth, fuelled by an export boom, has led to a steep decline in the wage share (Thorpe, 2008). In the United States, growth in real wages has been much below productivity growth (Greenhouse & Leonhardt, 2006). In Canada, the wage share of employees in the economy has fallen to its lowest level in 40 years. Labor compensation as a share of national income is now at about 63%, down from 70% in 1992 (*The People's Voice*, 2007).

In the United States, the 2006 share of wages and salaries represented 45% of the gross domestic product, and this share was less than both the 50% share of wages and salaries recorded in the first quarter of 2001 and the 54% share of wages and salaries recorded in 1970 (Greenhouse & Leonhardt, 2006).

In the Indian organized sector, the share of wages in gross domestic product for companies that are stock exchange-listed dropped from over 4% in 1996 to 3% in 2003, and it was under 3% in 2004. The share of profits has increased from 0.5% in 1990 to 3% in 2003 (Drabu, 2004).

There are also *big picture* concerns dealing with the consequences of globalization. An important contemporary issue is that the increasing pace of globalization has depressed wages in countries with high levels of imports (Slaughter, 1998). One explanation put forward to explain wage variations has been the opening up of economies to international trade (Baldwin & Cain, 2000; Haskel & Slaughter,

2001). Imports from low-wage countries reduce wages in the importing country, as the manufacturing of items and the provision of services are transferred overseas. Recent literature (Krugman, 2008) purports to show that rising globalization is associated with an increase in wage inequalities.<sup>1</sup>

With respect to countries that export, a line of research has suggested not only that wage inequalities are increasing, but that labor as a whole has lost ground to capital in both developed and emerging economies (Lee & Jayadev, 2005; Griffin, 2003). The secular fall of the labor's share is marked for countries that have experienced financial crises and large swings in the exchange rate, and the absence of capital account restrictions has been associated with a lower wage share (Lee & Jayadev, 2005).

The unequal distribution of the rewards of growth can adversely influence both future growth and the gains from such growth. By downwardly altering the share that employees of firms receive, this process can shrink overall market size and retard employee motivation. The ability of those in employment to buy the goods and services produced can be undermined by the shrinkage of the market. Economic growth and globalization, it seems, have not been associated with a rise in the wage share.

But what happens within the actual firms in exporting countries? It is the firms that eventually pay the wages. Do firms that export more, thereby participating more extensively in the global economy, share the rewards of such overseas market participation with their employees? This is an important issue, going to the heart of rent-sharing and good human relations, as it deals with how the benefits of the income generated within the firms themselves are shared.

There is an evolving literature, emerging about a decade ago, dealing with the sharing of corporate gains and incomes within firms, and especially whether or not employees participate in the sharing process. This literature (see the latest example, Esteveo & Tevlin, 2003) is predicated on the notion

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1. Yet, the evidence is far from negative. Feenstra and Hanson (1996, 1999) have studied job market effects in the United States with a focus on the offshoring of manufacturing and its effects on the skill wage premium. They do not consider the effects of service offshoring or its effects on employment. Offshoring of manufacturing has explained over 40% of the increase in non-production wages in the 1980s and about 40% of the increase in the skill premium in the United States in the 1980s. Service offshoring, to countries like India, will have been more skill-intensive (Amiti & Wei, 2005). Hence, the wage skill premium in the United States may have shifted in favor of countries such as India, where highly skilled employees have commenced providing services to clients in the United States. Whether this shift has happened or not is an issue that has never been studied.

that it is the proactive and dynamic firms that eventually display superior performance, and one indicator of proactive behavior is engagement in overseas markets.

Related to this contingency of international engagement, a small stream of literature has started investigating the relationship between overseas market participation and wage levels in firms. Nevertheless, the results are mixed. While the early test results for the relationship were positive, more recent evidence about emerging economies is mixed, raising the question of who benefits from firms' engagement in overseas markets.

Since an important policy recommendation for many emerging economies is to engage in export-led growth, if the outcomes are equivocal or inconsequential for the employees of these firms in the emerging economies, then a legitimate question can be raised with respect to such a policy: Why bother? Is such cynicism warranted for India's information technology sector? To address this concern, data on an unbalanced panel of 112 information technology sector firms for the period 2000–2006 are analyzed, and the results establish that firms that export more do share the benefits of engaging in global trade with their employees, at least in the information technology sector of India.

## 2. Will Average Compensation Be Higher in Information Technology-Sector Firms?

The issue of relative compensation differentials in information technology and software firms, vis-à-vis firms in other sectors, has not been systematically examined. The principles are discussed next. These are based on the notion that technological change has a strong impact on wages, which stems from the fact that such changes are essentially skill-biased, raising the relative demand for skilled labor and saving on less skilled workers (Berman et al., 1998; Machin & Van Reenen, 1998).

Recent literature (for details, see Majumdar, 2008) highlights the fact that information technology is a general-purpose technology. On this issue, the theoretical insights of Bresnahan (1999) are also important. The impact of information and communications technologies at the level of the firm is profound. This impact occurs not because of the usage of equipment, per se, but because of changes in the

organization of production and work within the firm, within the industry, and across industries. This is termed as organizational complementarity between the diffusion of information technologies in organizations and the use of higher-skilled and higher-paid employees.

It is a complementarity between information technologies and the human capital of users of these technologies. The diffusion of general-purpose information technologies makes the work of individuals more analytical and raises the return to cognitive skills and education. The skill bias arises from the shift out of the demand curve for highly cognitively skilled human capital with better mental skills (Hirshhorn, 1984) as the price of information hardware falls.

The diffusion of information technology and new work practices enables the transformation of jobs (Zuboff, 1988). For example, production and clerical jobs have evolved from specialized tasks with little in the way of decision-making power to more broadly defined jobs with higher levels of accountability. This has created a demand for a set of new skills for workers under the new work practices. The new skills comprise soft skills, such as communication, and interactive skills and hard skills, such as numerical and analytical skills (Applebaum & Batt, 1994). Interactive skills are necessary for workers to work within a team, to send and receive data among departments, and to communicate with external entities, including customers and suppliers. Numerical and analytical skills are important to operate equipment.

The firm-level impact of the diffusion is to increase the demand for additional new skills, such as the non-cognitive skills and higher-order mental skills necessary for dealing with a general-purpose technology. These skills include interpersonal and management skills, as well as skills to operate autonomously and to exercise judgment. There are monetary premiums for possessing these skills. In addition, information and communication technologies directly substitute machine decision-making for human decision-making in low-skilled and medium-skilled white collar work, augmenting individual productivity by changing the organization of work (Liker et al., 1999).

The effective use of information technologies also involves a substantial amount of invention by the using firms. Firms do not simply install informa-

tion technology equipment. Though such equipment can substitute for clerical skills, the substitution does not work simply by removing the people and installing the equipment. Instead, to gain from the equipment's capabilities, firms innovate in new ways of organizing work by defining new jobs, hierarchies, and management structures. The most information technology-intensive businesses use equipment both for improved customer service and as the basis for new and improved services.

Information technologies offer opportunities. Adopting companies can develop a new set of service delivery processes. The technical progress of enhancing equipment quality shifts the theoretical service delivery possibility frontier outward, so that firms can offer new services. The invention of new services those processes will deliver, and of the human side of the delivery mechanism, is a difficult class of tasks calling for qualified employees. Second, businesses deploying new information technologies tend to be more easily controllable than erstwhile people-based and paper-based businesses.

The rise of service sectors is characterized in turn by the immediate, simultaneous adoption of information technologies, and by the further increase in the ratio between skilled and unskilled workers. In particular, the progressive diffusion of information technologies within an economy calls for the complementary introduction of specific and dedicated human and fixed capital, as well as for the development of intermediate service activities. Such a diffusion complementarity, between information technologies and intermediate service activities, also affects the impact that the spread of such technologies may have at the macroeconomic level (Antonelli, 2003).

These phenomena raise the demand for two kinds of skilled human capital. First, there is demand for innovative managers who think of ways to take advantage of the new processes offered by information technologies. New, and scarce, cognitive and managerial skills are needed (Piore & Sabel, 1984). This raises the demand for such skills and makes them more expensive.

Second, the phenomena call for technical specialists in both user and supplier companies who can operate according to routines and control the vari-

ous facets of the new activities. Thus, wages will be higher for employees with higher skill levels who have the characteristics to be more productive when given access to new technologies (Mincer, 1974).

In addition, there are economic complementarity effects of the diffusion of information technologies. First, as information technology prices fall, leading to greater diffusion, demand rises for highly skilled and -compensated human capital. Second, in a group of complementary activities, an increase of any one activity increases the marginal productivity of another (Milgrom & Roberts, 1992). As a result, workers who perform non-routine tasks tend to gain larger benefits by using information and communications technologies as these become more pervasive. This is due to the greater co-invention opportunities for applying technologies in the workplace for these workers, compared to those other employees who perform routine tasks.

According to efficiency wages theory, firms will generally pay higher compensation to motivate these superior members of the human capital pool to devote higher levels of effort and take more responsibility (Baker, 1992; Bewley, 1999; Capelli & Chauvin, 1991). This can result in enhanced foreign market participation and foreign earnings. Yet, we know nothing about either the proportion of the total product of the firm that is shared with employees within information technology firms, or whether enhanced foreign market participation leads to a greater wage share in these firms.

### 3. Concepts and Evidence on Foreign Market Engagement and Employee Compensation

#### 3.1 Concepts

Considerable attention has been devoted to analysis of the capabilities of firms, as encapsulated in their human capital (Becker, 1975), and these capabilities are important for growth (Mankiw et al., 1992). International trade fosters rapid growth and productivity gains (Coe & Helpman, 1995). Growth occurs because globalization facilitates transfers of technology and market knowledge, leading to performance enhancements for firms (Grossman & Helpman, 1991).<sup>2</sup>

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2. *In fact, the offshoring phenomenon has had substantially positive productivity consequences for countries that have offshored manufacturing and service activities elsewhere. Amiti and Wei (2005) explore the effects of offshoring on*

Higher-quality employees, who will earn higher rewards, drive these phenomena because they translate knowledge into new products, services, and processes. In many cases, there is non-transferable knowledge encapsulated in a firm's workforce. Labor turnover is costly in such cases, so firms are interested in reducing separation rates. One way to achieve this is to pay a higher rate than the going wage that an employee could earn elsewhere.

The higher the exports and the share of profits earned globally, the more important it is for an experienced employee pool to be secure and high-quality, and the higher the wage premium can be. Thus, if higher-quality educated employees perform better in exporting firms, generating greater levels of exports, these firms should reward them more. Successful firms should share gains from global operations with employees.<sup>3</sup>

At the firm level, the effect of engagement in overseas trade and the determination of the wage share can both be explained by characteristics of the firms. Exporting firms have self-selected themselves into the export market based on their assumed higher capability levels. The export market offers increased opportunities for profit to be reaped by the firms more capable of meeting overseas market standards. Exporting imposes higher quality and performance hurdles. As a consequence, relatively few firms can achieve the status of being engaged in overseas markets.

To keep their overseas market engagement status current, the firms have to continuously meet performance standards. That means the demand for more educated and skilled labor is likely to be higher. This demand is also likely to be continuing. It can result in relatively higher levels of individual wages. Maintaining performance standards and consistency also implies keeping the firm's high-quality employees happy and motivated.

Also, the greater competition that exists in export markets forces firms to be more flexible, adaptable,

and innovative, so as to more efficiently use resources. This will encourage the employment of higher-quality and higher-paid employees. Additionally, with continuing growth, the firms may also pay more to reduce monitoring costs, labor turnover, and the threat of unionization. These factors ought to result in a higher share of wages in the firms' overall revenue structure.

Therefore, given higher levels of exports, firms should incur a higher wage share. In human capital-intensive sectors, such as information technology, the wage share of firms will generally be high anyway, for the reasons mentioned, but whether firms that engage in relatively higher levels of foreign market engagement also incur a higher wage share is an important issue that affects the attraction and retention of the talent that begets further growth and continued higher levels of foreign earnings (Singh, 2002).

An alternative possibility also arises. Firms with high export shares have sometimes experienced favorable foreign demand shocks, such as the Y2K phenomenon-related contingency that propelled Indian information technology and software firms to large-size status just over a decade ago. Firms that have experienced such shocks will have raised wages to attract a relatively larger and better workforce in response. Thus, the wage share of such firms will be higher.

### 3.2 Evidence

The literature that specifically looks at whether firms that export more do, indeed, pay more to their employees finds conflicting evidence. The first piece in the genre, by Bernard and Jensen (1995), had established that exporters exhibited superior performance characteristics relative to non-exporters across every dimension; such firms were larger, more productive, and more capital-intensive, and they also paid relatively higher wages and benefits.

Since then, Breau and Rigby (2006) have evaluated data from the Los Angeles area and found that

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*productivity in the United States manufacturing industries between 1992 and 2000 and find that service offshoring to countries such as India has had a significantly positive effect on productivity in the United States, accounting for around 11% of productivity growth. Offshoring of manufacturing also has had a positive effect on productivity, but the magnitude is smaller, accounting for approximately 5% of productivity growth.*

3. *On the question of firm and employee sharing of rents, Black and Strahan (2001), Blanchflower et al. (1996), Bronars and Famulari (2001), DiNardo et al. (1996), Estevao and Tevlin (2003), Hildreth and Oswald (1997), and Van Reenen (1996) are the recent articles in the genre. Their results point to a positive association between corporate performance gains and employee wages. These results are derived in the context of firms operating primarily within domestic economies, and no efforts are made to evaluate the consequences of globalization.*

the exporter wage premium disappears when employee characteristics are controlled for; Fafchamps (2007) has not established a positive link between wages and export status for Moroccan firms; and Milner and Tandraven (2007), who have studied African countries, have, indeed, established a positive wage premium for exports, but only when the exports were within Africa.<sup>4</sup>

Schank et al. (2007) find only mild evidence that German exporters might pay more, and those researchers show that the wage differential becomes smaller when observable and unobservable employees and workplace characteristics are controlled for,<sup>5</sup> while Tsou et al. (2006) show that, for Taiwanese manufacturing firms, a positive export and wage premium exists for skilled workers, but a negative export and wage premium exists for unskilled workers. Onaran (2007) finds that increased export intensity leads to a decline in the manufacturing wage share for firms in Turkey and Mexico, but that no significant effects exist for firms in South Korea.

The results show that financial sector issues have been dominant in influencing the wage share. Both recessions and nominal exchange depreciations have a clear and lasting negative effect on the manufacturing wage share in the countries studied. Increased export intensity has led to a decline in the manufacturing wage share in Turkey and Mexico, while favorable conditions for capital inflows also coincide with low wages. In other words, these results suggest that the stakeholders who provide financial capital have appropriated the relatively larger share of the product in the three countries studied.

Nevertheless, such evidence only relates to the manufacturing sector. Countries such as Germany, South Korea, Taiwan, Morocco, and Turkey have been exporters of manufactured goods. The nature of the industry matters a great deal, and in these

developing countries, surplus labor may have been used for exporting activities. We know little about what happens in the services sector, in general, and even less, if anything at all, about what might happen with respect to wages in information technology sector firms in India.

On the distributional wage share issue, a more recent and extremely small literature (Budd & Slaughter, 2004; Budd et al., 2005) evaluates whether firms that operate globally tend to share rent with employees and finds that they do. India, as has been admitted (Singh, 2002), completely missed the labor-intensive manufacturing exports boat that led many of the countries mentioned, such as Mexico, South Korea, and Taiwan, to cash in on exports as a driver for growth.

When Indian firms finally went global, it was in the information technology area. As such, they provide a fascinating laboratory to examine wage share issues, and particularly to examine whether the benefits of globalization have been shared with firms' employees. As Singh (2002) suggests, India is now in a position to replicate the East Asian phenomenon of exports-led growth with labor-intensive software services and more labor-intensive information technology-enabled services (ITES). The distributional relationship between globalization and wage share can shed light on an important emergent globalization phenomenon.

#### 4. The Indian Information Technology and Software Industry

The Indian information technology and software industry has a number of characteristics making it interesting. First, from its beginnings, the industry has focused on international markets. Briefly, in the early 1970s, the Indian government was highly protectionist and bureaucratic, making it difficult and

4. Milner and Tandraven (2007) state that their findings can be due to the nature of Moroccan manufacturing exports, which are concentrated in light industries with low wages, such as textile and garments. According to the standard comparative advantage model, the Moroccan experience of low wage labor being used for exports seems apposite. Moroccan manufacturing exports have not climbed the quality ladder, as Morocco exports only labor-intensive garment, textile, and leather products using a largely illiterate female workforce. This can explain why human capital does not play an important role in Morocco. Thus, what is exported matters in the way the gains from exports can be shared.

5. Their evidence for Germany shows that the exporter wage premium is neither large nor negligible, and that working in a plant with an export-to-sales ratio of 60% means that a blue-collar employee earns about 1.8% more, while a white-collar employee earns about 0.9% more compared to working in an otherwise identical plant that does not export at all. These are actually insignificant differentials, but they may arise because the manufacturing sector is the most important generator of exports in Germany, and it has faced price squeezes relative to the service sectors.

expensive to import hardware, as well as time-consuming to obtain approval for software exports. Yet, the setting up of the *Santa Cruz Electronics Exports Processing Zone (SEEPZ)*, near the airport in Mumbai, at Andheri (East), was the trigger that led a number of firms to start export-oriented information technology and software firms. The Indian information technology industry was born there.

Infrastructure issues, such as the lack of power and good communications throughout the country, had made it difficult for Indian software firms to compete. Then, in the mid 1970s and early 1980s, import duties were reduced, and export applications were cleared faster. In 1984, the government created the *Computer Policy*, which called for the development of different agencies for software promotion, as well as for the liberalization of imports for necessary inputs (Arora et al., 2001).

The government also established seven Software Technology Parks to be resource centers for software exporters (Correa, 1996). In the 1990s, liberalization continued, with more reductions on import duties and income tax exemptions for software exports. This liberalization of software policy during a time of low-cost labor in India, as well as increased worldwide demand, allowed Indian firms to develop and grow through exporting abroad. In contrast, the domestic market has not been a focus of the industry. The Indian software industry has limited links to the domestic Indian market, with a large proportion of its sales arising from exports.

The reasons for low domestic sales are the Indian government's focus on the exporting market, and the limited domestic demand for such products and services. Firms comprising the Indian software industry, therefore, have been born as global firms, with a focus on international markets. Moreover, these firms originated in India. Also, domestic Indian firms, those resourced and set up by Indian entrepreneurs operating from India and that are not subsidiaries of foreign firms, have been principally responsible for the growth of the Indian software industry (Kumar & Joseph, 2005). In sum, two major reasons for the development of an originally global software industry in India are the external environmental factors of policy-making to encourage exports in the Indian software industry, as well as the increased international demand for such services.

Apart from its global original nature, a second reason to focus on India's software industry has been its success. The Indian software industry has

been recognized as one of high growth, at more than 50% a year. The output value in this industry has increased more than 18 times in a decade. In 1999, the Indian software industry was estimated to have 18.5% of the world market, and in 1996, it was the source for outsourcing of more than 100 Fortune 500 companies (Arora et al., 2001).

Five years ago, the industry was expected to account for 20% of India's exports, to contribute about 20% to India's incremental GDP between 2001 and 2008, and to account for an estimated 7% of India's GDP in 2008 (Ambastha & Momaya, 2004). The latest data from NASSCOM (Nasscom, 2009), the industry trade association, shows that the information technology sector, with services valued at more than \$70 billion, has accounted for almost 6% of India's GDP. Direct employment has reached over two million, with 226,000 employees added in the last year, while indirect job creation has been estimated at almost eight million persons. Since organized sector employment in India is low (Mazumdar & Sarkar, 2008), the information technology sector is turning out to be one of the most important sectors for employment in India.

By studying such an industry in an emerging economy, important insights into the characteristics of a highly competitive and growing industry can be generated. In addition, a reason for studying the Indian software industry is the interest in high technology, originally global firms. As Rialp et al. (2005) point out, "a significant portion of the current literature on these businesses deals directly with high-tech businesses" (p. 152). By focusing on the Indian software industry, further insights can be provided into the strategic behavior of originally global firms in the high-technology area.

## 5. Analysis

### 5.1 Data

To test the relationship between wage share and foreign earnings of information technology firms, data sets drawn from a Reserve Bank of India database on financial accounts of non-government public limited companies have been used. The Reserve Bank of India database is an elaborate and consistent database on Indian companies maintained by the Reserve Bank of India from the financial year 1950–1951 onward, and is based on the balance sheets, profit and loss accounts, and annual reports of the companies.

Aggregates based on these accounts inform policy, primarily the monetary policy of India, and have been used for the compilation of national accounts. They have also been used to estimate the growth of the real sector of the economy. Given the needs of the Reserve Bank of India, only selected variables are available, and not all firm-level details may be found in these data. Nevertheless, for the purpose of this analysis, the database was useful.

The data relate to companies that are public limited, according to the definitions of the Companies Act, 1956, and some of these may be listed on stock exchanges. The Reserve Bank of India also collects similar data on private limited companies, as defined in the Companies Act, 1956, but these data are never released to outsiders. The overall data set comprises a pooled cross-section. The data are perceived to cover most sub-segments of the Indian corporate sector. The Reserve Bank of India public limited company data represent approximately 85% of the paid-up capital of 86 three-digit industries (Feinberg & Majumdar, 2001).

The consistent coverage over a long period has contributed to the high database quality. In the recent past, from 2000–2001, service sector firms have been added to the database, and of these firms, several belong to the information technology sector. Additionally, the data have been standardized into a common format by the Reserve Bank of India, across companies and time, to maintain consistency.

It was important that the coverage be not only representative of the population in each year, but that it was consistent over the period covered. Second, it was necessary to use a database taking adequate care of changes in accounting norms over this period. While the database is proprietary, it has been used for related policy work on the Indian corporate sector by various government bodies to report on policy matters. Private use of it is rare.

To construct the panel, data on an unbalanced panel of 112 information technology sector firms for the period 2000–2006 were used. Between 1,600 and 3,000 companies are surveyed each year. However, while the Reserve Bank of India has systematically collected data on large public limited firms, its coverage of the smaller public limited companies is somewhat sporadic and sketchy. Entries in and exits out of the sample are generally the smaller firms that may not submit data, rather than actual entries and exits. The total number of firm-year observa-

tions over the several years was 373. One aspect of firms not covered in this dataset is the nature of ownership, which is to say, whether a firm has any foreign ownership component.

The Reserve Bank of India database included several diversified firms. However, profits and other financial characteristics for the different business units of these firms were not separately recorded in the database. State-owned enterprises and privately held limited companies were excluded. Further, the analysis was confined to the information technology sector. The effect of the business cycle and institutional factors, such as credit availability, impact of fiscal policy, and fluctuations in interest and exchange rates would be similar for public limited firms in the sector.

### 5.2 Variables

The dependent variable was firms' wage structures, measured as the ratio of the total expenditures for compensation-to-sales (*wage share*), a common measure of the wage share in the literature (Katz & Murphy, 1992; Machin, 1996). The key independent variable was foreign earnings (*foreign earnings*), measured in the standard way, as the ratio of foreign earnings-to-total sales.

A number of control variables were included in the estimation. An important control variable was the level of firms' overhead costs (*overheads*), measured as the ratio of overhead costs-to-sales. These costs are all other costs, excluding material and labor costs, that firms incur. They include overhead costs relating to the operations of firms, as well as costs related to selling and general administrative activities. As firms shift away from labor-intensive operations, they will incur more of these indirect costs.

The other relevant control variable was the firms' profit share, since a significant portion of firms' product would be divided between wages to their employees, overhead costs incurred, and the profits made by these firms. The profits variable (*profits*) was measured by the ratio of gross profits-to-value of production. One would expect both the *overheads* variable and the *profits* variable to be negatively related to the wage share variable, since the three variables, in sum, would yield an accounting identity. As one of these variables goes up, the others go down.

Next, the ratio of firms' imports-to-sales (*imports*)

is introduced as a control variable since firms that acquire presumably better-quality inputs, whether materials or other items, from overseas would require better-quality and higher-paid staff to handle these, thus incurring a higher wage bill. An additional control variable has been the research and development spending ratio of the firms (*R&D*), as these expenditures could alter the relative wage share of firms in a direct and positive way, since innovative firms would also be presumed to be rent sharers with their employees. The debt equity or leverage ratio (*leverage*) was also used as a control variable, since lender pressures could influence firms to cut wage costs and thereby incur a lower wage share.

Finally, it is well known that employees of firms that are placed onsite, at the customer locale overseas, must be paid the prevailing foreign wage rate of the customer location. Thus, these relatively higher overseas wages can result in a higher wage share. So firms with a relatively large number of onsite employees can have a higher wage rate. This aspect is controlled for by adding an onsite wage variable that is the proportion of emoluments paid to employees located overseas as a function of sales. Since the primary employment is in India, and since whether or not the wage rate of those located in India is increasing with foreign earnings is the concern, to determine this, the offshore wages percentage (*onsite*) is included as a control variable.

## 6. Results

### 6.1 Estimation

An instrumental variable technique is used. This is the error components two-stage least squares approach (EC2SLS), which is more efficient than the standard classical two-stage least squares approach (2SLS) most commonly used to deal with issues of endogeneity (Baltagi, 2008). The intuition behind the EC2SLS estimator is that where the standard random effects estimator is a weighted average of the between and within estimators, the EC2SLS estimator is a weighted average of 2SLS estimation of a between estimator and 2SLS estimation of a within estimator (*ibid.*).

The foreign earnings variable is treated as endog-

enous, and the instrumental variables incorporated in the model are a size variable (*size*), as well as variables reflecting firms' engagement in the different segments of the information technology industry, such as hardware consulting (*hardware*), software consulting (*software*), data processing services (*data processing*), and database management services (*database*).

### 6.2 Discussion

The results of the regression are given in Table 1. The estimate for the *foreign earnings* variable is large in magnitude, positive, and significant (*t* statistic 2.78;  $p < 0.05$ ). As expected, the *overheads* and *profits* variables are negative and significant. The other variables are not significant. When the *onsite* variable is added in the regression, the results stay robust (*t* statistic 1.89;  $p < 0.05$ ).

The results establish that firms that export more do share the benefits of engaging in global trade with their employees, at least in the Indian information technology sector. As the Indian firms' share of foreign earnings rise, wage share rises. The literature on firms' rent-sharing predilections (Budd & Slaughter, 2004; Budd et al., 2005), contingent on meeting financial performance outcomes, generally finds a positive relationship between performance and rent sharing, albeit for Western economies. This trend is established here for India, but only in respect of information technology firms.

This trend is, however, only partly consistent with the evidence from other developing countries where it has been established that exporting firms are, in some instances, specifically for skilled employees, the high wage-paying firms. Of the six recent studies,<sup>6</sup> the findings, as generated from the manufacturing sector, have been ambiguous. Such ambiguities may have arisen because of the heterogeneity of employees, firms, and industries covered in the analyses. In contrast, this analysis, by focusing on one sector, establishes results that are unambiguous with the findings of the international rent-sharing literature and the presumptions of the skill complementarity idea.

In the Indian context, where it has been historically difficult to actually reduce employment numbers within firms (Mazumdar & Sarkar, 2008), a

6. Breaux and Rigby (2006) for the Los Angeles area of the United States; Fafchamps (2007) for Morocco; Milner and Tandruven (2007) for several African countries; Schank et al. (2007) for Germany; Tsou et al. (2006) for Taiwan; and Onaran (2007) for Turkey, Mexico, and South Korea.

Table 1. Results of the Error Components Two-Stage Least Squares Estimation

<b>Dependent Variable: Wage Share</b>	<b>Coefficient (Standard Error)</b>	<b>Coefficient (Standard Error)</b>
Constant	30.032*** (4.609)	30.118*** (5.008)
<i>Foreign Earnings</i> <sup>#</sup>	0.202** (0.072)	0.180** (0.099)
<i>Overheads</i>	-0.267*** (0.042)	-0.261*** (0.044)
<i>Profits</i>	-0.308*** (0.037)	-0.305*** (0.036)
<i>Imports</i>	-0.072 (0.063)	-0.070 (0.060)
<i>R&amp;D</i>	-0.541 (0.486)	-0.529 (0.458)
<i>Leverage</i>	-0.122 (0.351)	-0.123 (0.340)
<i>Onsite</i>		0.414 (0.860)
<i>R</i> <sup>2</sup>	0.338	0.349
<i>N</i>	373	373

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , and \*  $p < 0.10$ . # *Instrumental variables used for the foreign earnings variable are segment participation dummies for hardware consultancy, software consultancy, data processing services, and data-base management services.*

lower wage share for exporting firms could be consistent with the explanation that such exporting firms may actually be paying lower wage rates than firms that export relatively less, so as to exploit India's comparative advantage in cheap, but not necessarily technologically capable, labor.

This is an application of the classic theory of international trade, whereby a country uses its primary source of competitive advantage, cheap labor. Thereby, firms can enhance their revenue and profit streams, but these enhanced amounts are not necessarily shared with one of the major producers of these fiscal flows. These rents are extracted as profits or wasted because of inefficiencies in higher levels of overhead expenditure.

But this logic, while tenable in the manufacturing sector, will simply not hold true in a human capital-intensive sector such as information technology, and this has shown to be the factual case, since, as a sunrise industry, it will not possess the union strength to protect employment. In addition, voluntary turnover of employees will be substantial, because employment opportunities are robust in

a high-growth sector. Thus, motivations for employment protection will be low. Since the sector has been growing substantially, the rate of employee attrition will provoke firms to incur a high wage share so as to retain the best talent that can propel the firms' growth trajectories onward. The Indian information technology sector thus effectively uses its primary source of competitive advantage, highly skilled people.

Also, in the Indian information technology sector, there has been an important recognition of the need to move up the value chain. This means offering higher value-added services involving design and strategy (Singh, 2002).

Another possibility is offering complete service packages. As Singh notes, in a service pack-

age provided to customers, there is also a higher management component than there is in simple software development activities. India has a number of professionals with combinations of engineering and management skills deployable in these areas. One way to motivate these professionals is to offer higher emoluments and to share rents earned in global markets. The transition to business segments well up the value chain will imply that firms will spend a higher share of their firms' revenues as wages.

How do the results matter in a global sense? Feenstra and Hanson (1996, 1999) have shown that, for the manufacturing sector, offshoring has been associated with increases in non-production wages and the skill premium in the United States in the 1980s. Service sector offshoring to countries like India (in information technology), on the other hand, has been skill intensive. Thus, the wage skill premium in the United States may have shifted to countries such as India, where skilled employees provide services to United States clients. Such an effect will drive United States firms to be innovative

and keep seeking to go further up the knowledge value chain. A race may be on.

Yet, the service offshoring phenomenon, based on information technology, can have substantially positive global productivity consequences. As Amiti and Wei (2005) show, service sector offshoring has accounted for around 11% of productivity growth in the United States. If the rising wage share of information technology firms in India is an indication, these firms are likely to also be the more productive firms, given that they will possess a more capable and motivated employee pool, so they will be able to translate some of their own productivity gains into the organizations that form their global client base via spillovers.

The spillovers from this process can be very large, because the information technology sectors around the world are interconnected and central to the world of business that exists today. The productivity benefits that are felt within the core, such as in Indian firms, are then transmitted via the substantial interconnectivities that information technology companies engender.

Interconnectivities give rise to magnification of productivity gains. Thus, a relationship between exporting and wage share, established in one sector (the information technology sector) of one country (India), can have crucial global productivity consequences in the long run. The new wealth of nations, increasingly a function of the use of information and knowledge items, and spread everywhere because of interconnectivities, then hinges critically on appropriate relationships at the firm level between important factors, such as exports and wages.

## 7. Conclusion

This analysis has evaluated the relationship between foreign earnings and wage share for a large number of information technology firms in India, over a recent period, 2000–2006. These firms have made up a large share of information technology–sector enterprises in India. The detailed micro-econometric results, established after taking into account that exporting and generating foreign earnings is an endogenous phenomenon, show that the foreign earnings and wage share relationship is positive and significant for Indian firms.

These results are partly consistent with the findings from other countries, which show that the

foreign earnings and wages relationship is positive, though there is some ambiguity about those relationships. While there is disquiet with rising wage variations in India, as the gains from growth have been appropriated by stakeholders other than those who provide firms with their human capital, firms that are actively engaged in the global information technology economy have at least done something to redress this matter with their behavior, as shown by the positive micro-econometric foreign earnings and wage share relationship. The consequences of globalization have been positive for the employees of Indian firms, at least in the information technology sector. ■

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