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ARE EMERGING MARKETS DIFFERENT FROM DEVELOPED MARKETS? HUMAN CAPITAL, SORTING AND SEGMENTATION IN COMPENSATION OF INFORMATION TECHNOLOGY PROFESSIONALS

Les marchés émergents sont-ils différents des marchés développés ? Capital humain, tri et segmentation dans la compensation des professionnels en technologie de l'information

Completed Research Papers

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Abstract

This study investigates how firms compensate IT professionals in an emerging market. Using data on compensation of more than 8000 Indian IT professionals, the study finds evidence that returns on MBA grow or stay constant with overall work experience for IT professionals, a finding consistent with the human capital view, than with the sorting view. We also find evidence for segmentation of labor markets based on firm origin because foreign firms pay significantly more to IT professionals than Indian firms. Finally, we find high returns on technical education but significant heterogeneity in returns on business education at master's level in India. On the whole, returns on business education at master's level are not significantly higher than that on experience suggesting a lack of financial incentive to pursue business education at master's level in India. The returns to IT experience and non-IT experience are significantly higher in India than in the U.S.

Keywords: Returns on Managerial and Technical Education, Returns on IT experience, IT professionals, IT service providers, Compensation, Emerging Markets

Résumé

Cette recherche étudie comment les sociétés rétribuent leurs informaticiens dans le contexte d'un marché émergent. Utilisant des données indiennes, l'étude montre que le retour sur investissement du MBA croît ou reste stable en fonction de l'expérience globale de travail des informaticiens. Nous montrons également que les entreprises étrangères rémunèrent sensiblement plus les informaticiens que les sociétés indiennes.

Introduction

IT professionals are an important resource in a modern economy because of their role in creating an IT platform, which in turn provides agility to undertake new strategic initiatives (Ferratt et al. 2005; Josefek and Kauffman 2003b; Moore and Burke 2002; Moore and Love 2005; Sambamurthy, Bharadwaj and Grover 2003). Increasingly, many large firms depend on their IT service providers typically located in emerging markets to develop and maintain their IT applications (Apte and Mason 1995; Carmel and Agarwal 2002; King and Torzkadeh 2008; Oshri, Kotlarsky and Willcocks 2007). Beyond sourcing products and services from emerging markets such as India and China, many Fortune 500 firms have established their production and service operations in these markets because they present significant opportunities to grow revenues, reduce costs and innovate by leveraging global talent pool (Gupta and Wang 2007; Lewin and Couto 2007). These firms rely on IT professionals in India to create their information infrastructure not only for these markets but also to support their global operations.

India offers an opportunity to test some of the predictions of the economic theories on compensation in an emerging market context with respect to an increasingly important but relatively less studied professional group, that is, IT professionals. India is a leading destination for offshore outsourcing and accounts for more than 60 percent of the global offshore IT industry and close to 50 percent of the global business process offshoring industry (NASSCOM-McKinsey 2005). The information technology and business process outsourcing sector in India has witnessed significant growth both in terms of exports and the number of IT professionals over the last decade. According to an estimate, the IT and business process outsourcing (BPO) (also called IT-enabled services[ITES]) industry currently employs nearly 700,000 personnel directly and about 2.5 million workers indirectly (NASSCOM-McKinsey 2005). McKinsey and IDC studies project Indian IT-ITES Industry to achieve USD 60 billion in exports by 2010 with an overall market size of more than USD 100 billion by 2011 (IDC 2007; NASSCOM-McKinsey 2005).

Despite significant optimism about India's potential in the IT services area, growing demand for IT professionals in India has led to significant increase in salaries and very high attrition rates. Many firms are finding it hard to retain their experienced employees and some studies even project a shortfall of qualified personnel in near future (NASSCOM-McKinsey 2005). Rising salaries and attrition rates of IT personnel have raised concerns because these factors are likely to affect cost competitiveness and ability to deliver quality of service that many customers have come to expect from India-based IT service providers. There is little academic research to guide decision-making of firms and individuals to cope with these challenges because extant academic literature on compensation of IT professionals is mostly based on studies in the context of developed economies and from IT user organizations (Ang, Slaughter and Ng 2002; Levina and Xin 2007; Mithas and Krishnan 2008; Mithas and Lucas 2008; Truman and Baroudi 1994).

Why is an understanding of compensation of IT professionals emerging markets important? First, it is necessary to test generalizability of the findings from developed markets in emerging economies. Recent research by Lacity et al. (2008) documenting that models developed and tested for workers in developed markets may not generalize well in other country contexts suggests a need for studies focused on emerging markets. Other studies have also called for research to investigate the extent to which compensation findings generalize across country settings to inform strategic choices with respect to human capital investments and compensation related decision-making of firms and IT professionals (Aggarwal et al. 2006a; Gerhart and Rynes 2003; Hirschheim et al. 2005). Second, to the extent returns to education and experience vary across national contexts (Psacharopoulos 1994), firms need a deep understanding of how to value the managerial and technical competencies of IT professional in emerging markets.

This study focuses on compensation of IT professionals in India both because of their importance in global software production and dearth of knowledge on returns to education and experience of these professionals. The study tests the human capital, sorting and segmentation theories of labor markets for IT professionals in an emerging economy. In particular, we focus on the following research questions: (1) Are returns on MBA for IT professionals consistent with the human capital view or with the sorting view? (2) To what extent, compensation of IT professionals is in accord with the view of segmented labor markets, that is, do foreign firms pay more to IT professional compared to domestic firms?, and, (3) Finally, to what extent the findings on compensation of IT professionals in developed markets generalize to emerging economies? Similar to Dewan and Kraemer (1998;

2000) who study returns on IT investments across developed and developing countries, we focus on returns on investments in human capital of a key IT resource, that is, IT professionals in India to test some of the conjectures related to relative returns across developed and developing economies. We utilize data on more than 8000 IT professionals belonging to more than 50 IT and IT enabled services firms located in India to answer these research questions.

This study makes important contributions from research and managerial perspective. From a research perspective, this study examines the generalizability of previous findings related to compensation of IT professionals in IT user organizations in developed countries such as United States (Ang, Slaughter and Ng 2002; Levina and Xin 2007; Mithas and Krishnan 2008; Truman and Baroudi 1994) by evaluating returns on education and experience in an emerging economy. From a managerial perspective, an understanding of how firms price competencies and experience of IT professionals is crucial to inform compensation practices of domestic and U.S. firms located in India because dissatisfaction with compensation is an important reason for the loss of IT professionals (Ferratt et al. 1999). Such an understanding is also important for informing IT professionals' human capital investment decisions.

Theory and Hypotheses

Human Capital versus Sorting in Returns to an MBA

While one can conceptualize critical competencies of IT professionals along multiple dimensions (Bharadwaj 2000; Lee, Trauth and Farwell 1995; Nunamaker, Couger and Davis 1982; Smaltz, Sambamurthy and Agarwal 2006), we focus here on business management competencies and technical competencies as reflected in their educational investments and IT experience. Managerial and technical competencies of IT professionals are critical for enabling and executing firms' business processes through IT infrastructure capabilities (Luftman, Lewis and Oldach 1993; Ross, Beath and Goodhue 1996). Prior research suggests that managerial competencies are more important for IT professionals and may have a more significant impact on their career prospects (Chabrow 2006; Ferratt and Agarwal 1996; Lee, Trauth and Farwell 1995; Pratt 2006; Smaltz, Sambamurthy and Agarwal 2006; Tam 2007). Lee et al. (1995) document an industry demand for IT professionals with a strong background in business. Smaltz et al. (2006) also suggest the need for IT professionals to acquire management knowledge and competencies.

IT professionals recognize the need to complement their technical skills with an understanding of various business functions and processes, and many return to business schools to obtain an MBA to fill in the gaps in their business knowledge. While business schools and the availability of a wide array of customized MBA programs has proliferated in India to meet the growing demand for MBAs, doubts linger whether monetary and time investments in an MBA education are worthwhile (see Pfeffer and Fong 2003). Therefore, from an IT professional's perspective, it is important to know the importance of pursuing a managerial education, vis-à-vis other alternatives, in economic terms.

From a theoretical perspective, human capital (Becker 1975) and sorting theories (Weiss 1995) explain why MBA degree will lead to higher compensation. Human capital theory argues that the learning and productivity advantage due to the accumulation of superior managerial competencies and business knowledge due to MBA would enable IT professionals to coordinate the multifaceted activities associated with the successful implementation of IT systems in a better way than those who do not have MBA. Because firms benefit from such MBA induced learning and productivity advantages, firms will likely provide a salary premium for IT professionals with an MBA.

Sorting theories provide a complementary perspective and although these theories acknowledge a potential learning or productivity advantage due to an MBA, they emphasize that an MBA may serve as "a signal or filter for productivity differences that firms cannot reward directly" (Weiss 1995, p. 134). In other words, these theories conceive of an MBA as having a correlation with pre-MBA productivity differences among workers. Sorting models encompass two variants: signaling and screening. While in signaling models, informed IT professionals signal their productivity advantage through an MBA, in screening models, uninformed firms screen on the basis of an MBA.

Despite the differences in relative emphasis on why an MBA commands a salary premium, human capital and sorting theories do not predict differential private returns to MBA from an IT professional's perspective. But these theories predict differential social returns to education. Distinguishing between human capital and sorting theories is important when one suspects that the social returns may differ from private returns and may cause distortions in the market such as over-consumption of education. Social returns to education are important in India

where government sector provides significant subsidies to education sector. Many of the premier educational institutions in India were started by government and still enjoy significant subsidies in return for political patronage and influence (Das 2002). The central, state and local governments provided more than 90% of the total income of educational institutions in India during 1990-1991 (Economic Survey of India 1996-97). These subsidies are quite significant even in higher education and although they are declining after economic liberalization in 1991, they continue to be a significant source of funds for colleges and Universities in India. In particular, government sector provides significant support even at the MBA level compared to the government support for MBA education in the United States.

Although human capital models allow for the possibility that by including the proxies for “unobserved ability” of employees returns to an MBA are likely to decline in econometric specifications, sorting models suggest that if firms do not observe these proxies for “unobserved ability” or cannot use these in making employment decisions because of legal or ethical reasons, they will still screen employees on the basis of educational or other signals as long as they are correlated with “unobserved ability,” and employees will invest in education to signal such unobserved abilities. Despite these difficulties in testing human capital versus sorting explanations (Riley 1979; Weiss 1995), if sorting alone drives returns to an MBA, there should be a divergence of returns to an MBA at higher experience levels (see Layard and Psacharopoulos 1974). This is because for employees with high experience levels, firms have complete information about their productivity and will have adjusted their compensation. Thus, if an employee’s actual productivity some time after recruitment differs from the expected productivity at the time of recruitment based on MBA-related signaling and screening, we expect to observe divergence in returns to an MBA over time. Therefore, we posit the following alternative hypotheses, consistent with the human capital and sorting views to infer as to which of these explanation has greater applicability in the context of IT professionals.

H1a: The returns to an MBA (relative to a bachelor’s or master’s degrees) grow or stay constant with overall work experience if the human capital view holds.

H1b: The returns to an MBA (relative to a bachelor’s or master’s degrees) decline with overall work experience if the sorting explanation applies.

Segmentation of Labor Markets Based on Firm Origin

Theory of segmented labor markets suggests that labor markets exhibit segmentation and even though some segments are more attractive than others, these differences persist due to mobility barriers or certain other institutional factors (Gerhart and Rynes 2003). Prior research has explored several dimensions of segmentation such as for-profit versus non-profit organizations, unionized versus non-unionized firms and information-intensive versus non-information-intensive firms (Ang, Slaughter and Ng 2002). Because we focus here on for-profit, non-unionized and information-intensive firms, we do not explore these dimensions of segmentation and instead focus on domestic versus foreign origin of firms along which there is sufficient variation in our data and this is also a dimension that is quite salient in the Indian context.

We expect foreign firms to pay more to their IT professionals than domestic firms for three reasons. First, foreign firms follow relatively standardized human resource practices across the world and are used to pay well to their employees in developed markets, they have to pay relatively better to their Indian employees also to conform to their global compensation practices and their high-wage firm image (Mandel 2008). Second, foreign firms demand high productivity at par with the one prevailing in developed markets, they need to attract the best among high skill employees and pay is one such mechanism to get attention of the best possible talent at the entry level. Finally, foreign firms being much less hierarchical than Indian firms, they need employees who can work without much supervision. By paying a gift of high wages, firms expect employees to put their best effort or risk losing their high paying jobs.

H2a: Foreign firms will pay more to their IT professionals than firms of Indian origin after controlling for education, experience and other demographic factors.

In addition to higher levels of wages, we also expect that foreign firms will value education and experience of IT professionals differently than Indian firms. In particular, foreign firms are more likely to value the skill set that comes with an MBA because of greater opportunities to be able to use those skills. Likewise, foreign firms are likely to place a premium on returns to firm-specific IT experience because they can make the fullest use of IT

professionals' technical and IT proficiencies and have the necessary scale to leverage and deploy IT professionals with firm-specific experience in other business units and projects (Mithas and Krishnan 2008). Thus:

H2b: Foreign firms will value MBA education and firm-specific IT experience more than the domestic firms.

How Returns on Education and Experience in an Emerging Economy Might Differ from that in a Developed Economy

Economic theory suggests that returns to a resource are higher where they can be put to best use. However, it does not provide a clear answer whether returns to education and experience will be higher in a developed or a developing country. On the one hand, some suggest that "education yields higher returns in advanced societies" (Blinder 2006) because of plentiful complementary resources and agglomeration economies in a developed country context (Porter 1998). On the other hand, because of the differences in the stage of development across developed and developing countries and because of differences in working for a client versus a vendor firm, we expect returns on education and experience to differ in India compared to those in developed economies for at least three reasons. First, because of significantly higher opportunities to tap the unrealized potential that exists in developing countries compared to that in developed countries, we expect that marginal returns on education will be higher in developing countries than in developed countries. This idea is consistent with the notion that an emerging economy offers more opportunities for growth than an already developed economy because of lower base and more room for "catching-up" to occur (Abramovitz 1986). Empirical studies on returns to education across countries provide some support for this conjecture because economic returns to education are higher in developing countries than in developed countries (Psacharopoulos 1994).

Second, compared to IT user firms in developed countries, IT vendors can better allocate IT professionals to the projects that will challenge their software skills and intellectual abilities while providing them opportunities to upgrade their skills to help them maintain their marketability (McFarlan and Nolan 1995). Many IT professionals recognize these advantages of working for IT vendor firms because of the potential of better career and salary opportunities and are willing to shift from IT consuming firms to IT vendor firms. This reasoning also applies to the fully owned subsidiaries of multinational firms located in India that provide software services for the globally distributed business units and act as their internal vendor. Thus, because IT professionals in India can cater to diverse IT needs of internal or external customers across the globe much more effectively than IT professionals who are located in a developed country and cater to only a specific and narrow set of customers or requirements, we expect that returns to MBA degree and IT experience will be higher in India than in the U.S.

Third, returns to education are likely to be higher in India because of relative shortage of highly educated IT professionals in India compared to say a developed economy like the United States. For example, less than 10% of Indian population has access to post-secondary or college education compared to upwards of 50% of population in the U.S. with a college degree (Aggarwal et al. 2006b). In addition, compared to U.S., the entry barriers for getting education and a degree at top Indian educational institutions (e.g., IITs) are quite high and in some cases the selectivity is even more restrictive than in top U.S. universities. Against the backdrop of relatively lower educational attainments in the population, the IT professionals who are able to successfully navigate the rigors of the Indian educational system have plenty of opportunities open to them that are likely to lead to higher returns to their education in India than what a typical IT professional will experience in a developed economy.

One important factor that distinguishes a developed economy from a developing economy is the opportunity cost of education in terms of foregone earnings and returns on lost work experience which may be quite high during growth phase of an emerging economy. Indian economy grew at the rate of more than 8.5% during 2003-2007. This growth has created an unprecedented demand for IT professionals leading to significant valuation on work experience. Human capital theory postulates work experience as an important component of human capital because it creates a productive capacity. Following human capital reasoning, IS researchers have argued that IT related technical competencies are likely to be reflected in the on-the-job IT experience of IT professionals because these are essentially skill-based competencies with action orientation, that are acquired largely through learning by doing (Ang, Slaughter and Ng 2002).

While human capital theory treats both education and experience important in their own right to create productive capacity of workers, it also acknowledges the tradeoffs that one has to make to optimize one's lifetime income considering both the investments that one has to make and the opportunity cost of pursuing education. Rosen (1972, p. 341) notes: "labor market can be viewed as a mechanism for 'trading' in lifetime incomes and wealth." IT

professionals can acquire more education but doing so comes at the expense of foregone salaries, work experience and additional costs of tuition. Even if one can afford the cost of extra education, it is of interest to know how firms value these options in relative terms in an Indian context compared to a developed economy context where education is prized more highly than experience (Mithas and Krishnan 2008). On the whole, because education provides conceptual abilities (Lunsford 2007), many of which are difficult or more costly to acquire only through experience (Katz 1974), we posit as a baseline that firms value an educational degree much more than they value an equivalent amount of work experience. Thus:

H3a: Firms value educational investments (an MBA or a master's and a bachelor's degree) more than they value IT experience of IT professionals in Indian context.

While we posit that firms will value educational endowments more than IT experience, we do not treat all work experience same. Because many current IT professionals start out in non-IT jobs, and therefore total work experience of an IT professional can be decomposed into occupation-specific experience (i.e., IT experience) and non-IT experience (Bartol and Aspray 2006). IT experience can be further subdivided into general IT experience (or IT experience at other firms) and firm-specific IT experience (or IT experience at the current firm) (Josefek and Kauffman 2003a). Our goal here is to understand how firms might value these dimensions of an IT professional's work experience differently in India.

On one hand, prior research has suggested several arguments for returns to tenure or firm-specific experience: to reflect a worker's share of investments in firm-specific skills as in the theory of specific human capital, to discourage high-turnover employees from applying or by making them pay for the turnover costs by foregoing higher earnings in future as in sorting models (Salop and Salop 1976), to defer compensation as an inducement for workers not to shirk as in supervision models (Lazear 1981) and as an insurance to workers against adverse changes in perceived abilities as in risk aversion models (Harris and Holmstrom 1982). Applying these arguments to IT professionals, one can argue that IT professionals with tacit knowledge of a firm's IT infrastructure and understanding of the unique needs of the firm's customers are likely to be more productive (Josefek and Kauffman 1999). On the other hand, research also suggests that firms are likely to value IT experience at other firms higher than they value IT experience at the current firm because of greater standardization of hardware, software, and methodologies in recent years (Davenport 2005; Ramasubbu et al. 2008), coupled with likely savings in training costs and outside learning advantages due to hiring experienced professionals from the outside (Daveri and Maliranta 2007; McGee 2007; Mithas and Krishnan 2008).

Although prior research in the US context suggests that firms value IT experience at other firms more than they value firm-specific experience, this finding may not hold in an emerging economy for two reasons. First, an emerging economy may not have as much of standardization of hardware, software, and methodologies. Second, the labor market may lack depth preventing firms to tap outside expertise given the scarcity of trained and experienced people in a growing economy. Despite these differences, following prior empirical research (Mithas and Krishnan 2008), we posit as a baseline that firms are likely to value IT experience at other firms higher than they value IT experience at the current firm in India also. As in the US, we expect that firms in India are likely to place a much lower value on non-IT experience than they do on IT experience. Thus:

H3b: Firms will value IT experience at other firms more than they value IT experience at the current firms, in Indian context.

We identify and control for other relevant variables in our models of compensation for IT professionals, such as age and gender. We also use dummies for each year of the salary survey, which enables us to control for an unemployment situation and, thus, consideration of demand factors in the labor market.

Method

We obtained the data used in this study from a leading market research firm in India which conducted three national surveys of IT professionals for the 2005-2007 period. These surveys were designed to elicit information regarding number of IT employees, their composition in terms of work experience and gender etc, salary level and structure, and tenure of top management, etc. The market research firm carried out the surveys in two phases every year. For example, in 2006, our research site sent out a detailed human resource questionnaire to 250 IT companies located in India in the first phase. The survey covered both the domestic companies (e.g., Infosys, Wipro, TCS, Patni) and foreign companies (IBM, EDS, Sun Microsystems, Siemens, Flextronics) who have located their IT

operations in India. Of the 250 companies, 51 companies participated in the first phase for a response rate of 20%. Our research site then selected top 32 firms out of these 51 firms for the second round of IT employee survey that targeted 3006 IT employees directly. The employee survey comprised a self-administered questionnaire as the instrument that included questions related to job satisfaction, compensation and retention behavior. The research firm tried to get an unbiased sample ensuring that the management of the company did not influence the selection of respondents or their responses and respondents were promised confidentiality of their individual response. A broadly similar strategy was followed for 2005 and 2007 with approximately similar response rates.

The surveys during 2005–2007 covered more than 8,000 IT professionals. To our knowledge, this is the largest and most complete source for salaries of IT professionals employed in information technology and IT-enabled services firms located in India. We believe that the respondent profile in these surveys is a reasonable representation of Indian IT professionals in the IT services sector because respondents cover several firms of varying sizes and are involved in software development, software/systems maintenance, and IT related sales and marketing functions. The salary surveys contain information on respondents' total compensation, demographics, and human capital-related variables. We used similar and comparable questions across the years to construct the variables used in this study. Because of the study design that randomly picks employees from participating companies and high turnover rates, we expect negligible amount of overlap in terms of survey respondents across years.

Table 1 provides a description of variables we used in this study. Table 2 provides descriptive statistics. Table 2 shows that in terms of respondents' highest degrees, 49% have a bachelor's degree in engineering, 7% have a graduate degree in a field other than engineering, technology, computers or business (the "graduate" nomenclature is somewhat misleading here because the "graduate" degree in India is equivalent to a bachelor's degree in the US), 6% have an MBA, 6% have a master's degree in technology (M.Tech), 15% have a master's degree in computer applications (MCA), 9% have a post graduate degree in a field other than engineering, technology, business or computers (this "postgraduate" degree is in fact equivalent of a "master's" degree in the US), and remaining 8% have a diploma or a certificate (equivalent of an "associate" degree in the US). The surveys capture the age of the respondent as a bracketed variable and our data contain respondents ranging from those who are less than 20 years old to those who are more than 45 years old. The average age of IT professionals in our data set is somewhere between 26 to 30 years. They have approximately 5.4 years of total experience, 4.8 of which is IT experience (2.5 years at their current firm and 2.3 years at other firms). Approximately 78% of IT professionals in our data are male.

Following previous research in the labor economics (Angrist and Krueger 1999; Krueger 1993) and IS literature (Mithas and Krishnan 2008), we specify standard cross-sectional log-linear earnings models. Let W represent the annual salary of the respondent; X_1 a vector of educational endowments and experience related endowments associated with the respondent, X_2 a vector of observed demographic characteristics associated with the respondent (e.g., age, gender), and Z a vector of observed characteristics associated with the institutional context (e.g., firm size, firm origin), respectively.

$$\ln W_i = \alpha X_{1i} + \beta X_{2i} + \gamma Z_i + \delta X_{1i} Z_i + \varepsilon_i, \quad (1)$$

where α , β , γ , and δ are the parameters to be estimated and ε is the error term associated with observation i .

We estimate Equation 1 by ordinary least squares, Tables 3-5 show results. The explanatory power of our models, as reflected by the overall R-square values, is reasonable and comparable to that in previous research (e.g., Krueger 1993). We present results for various subgroups separately (see Tables 3 and 5) for better interpretation and to allow greater flexibility in parameter estimates (Achen 2005; Wooldridge 2003). We report heteroskedasticity-consistent standard errors in all our models.

Results

We find support for H1a but not for H1b. H1a predicted that the returns to an MBA (relative to a bachelor's or master's degrees) grow or stay constant with overall work experience if the human capital view holds. In contrast, H1b predicted that the returns to an MBA decline with overall work experience if the sorting explanation applies because as firms get to know the true productivity of their IT professionals, they are likely to adjust compensation downwards if the initial return to an MBA was based only on screening (ignoring the problems caused by on-the-job training) (see Layard and Psacharopoulos 1974). Table 3 shows that the returns to an MBA are consistent with the human capital view because the differential returns to an MBA (with respect to a non-engineering bachelor i.e., edugrad) hold at all experience levels and in fact, grow larger with increasing work

experience. Therefore, we conclude that returns to an MBA reflect both private returns to individuals and productivity premiums paid by firms for the MBA skill set, and more consistent with the human capital view than with the sorting view.

Table 1: Variable Definition

Variable	Definition/ Operationalization
<i>Intot</i>	Natural log of gross compensation of IT professionals in Rupees by adding their gross take home pay including allowances without including stock options and other non-monetary benefits. We deflated the 2006 compensation to 2005 Rupees by using Reserve Bank of India's (RBI) Consumer Price Index for Urban non-Manual employees (see RBI Bulletin, Table 247: Consumer Price Index (Average of Months) Annual Variation) and 2007 compensation to 2005 Rupees by using RBI Table 245 CPI annual variation based on average of months.
<i>age</i>	Respondent age is measured in number of years, bracketed variable, 1=less than 20, 2=21-25, 3=26-30, 4=31-35, 5=36-40, 6=41-45, 7=more than 45.
<i>edubeng</i>	Whether the highest educational degree of the respondent is a bachelor's degree in engineering (1 = yes, 0 = no).
<i>edugrad</i>	Whether the highest educational degree of the respondent is a Graduate degree other than Technology, Computer Applications or Business (1 = yes, 0 = no). These are typically bachelor of arts, bachelor of science or bachelor of commerce degrees.
<i>edumtech</i>	Whether the highest educational degree of the respondent is a Master's degree in Technology, (1=yes, 0=no).
<i>edumca</i>	Whether the highest educational degree of the respondent is a Master's degree in Computer Applications, (1=yes, 0=no).
<i>edupostg</i>	Whether the highest educational degree of the respondent is a post-graduate degree other than Technology, Computer Applications or Business (1 = yes, 0 = no). These are typically master of arts, master of science or master of commerce degrees.
<i>edumba</i>	Whether the highest educational degree of the respondent is a Master's degree in Business, (1=yes, 0=no).
<i>itexpcurrco</i>	IT experience (in years) at the current firm.
<i>itexpotherco</i>	IT experience (in years) at previous firms.
<i>totexp</i>	Total work experience in years.
<i>male</i>	Indicates the gender of the respondent (male = 1, and female = 0).
<i>foreign</i>	Denotes whether respondent works for a firm of foreign origin or with headquarters located outside India, (1=yes, 0=no).
<i>firmsize</i>	Denotes organization size and is a bracketed variable that indicates a range for the number of employees in the respondent's firm (1 = fewer than 500, 2 = 501–5000, 3 = 5001–50000, and 4 = more than 50,000). Use of this variable accounts for potential labor quality differences due to firm size (Brown and Medoff 1989).
<i>year dummy</i>	Dummies for the salary survey years 2006 and 2007 to control for unemployment rate and, thus, consideration of demand factors in the labor market (Granovetter 1981).

Interestingly, we also observe that IT experience (both at the current firm and at other firms) has greater value in early career stages and becomes less valuable in later stages of career while education continues to play a large role in determining compensation at all experience levels. These results lend credence to the notion of depreciation

and obsolescence of IT competencies with passage of time because of dynamic nature of the technology evolution and the IT profession (Ang and Slaughter 2000).

Table 2: Descriptive Statistics

	2005			2006			2007			total		
	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd
Intot	2757	1.44	0.78	2917	1.35	0.74	2679	1.5	0.73	8353	1.43	0.75
edubeng	2757	0.47	0.5	2917	0.5	0.5	2679	0.5	0.5	8353	0.49	0.5
edumba	2757	0.07	0.26	2917	0.07	0.25	2679	0.06	0.23	8353	0.06	0.25
edumtech	2757	0.06	0.24	2917	0.06	0.23	2679	0.06	0.25	8353	0.06	0.24
edumca	2757	0.15	0.36	2917	0.16	0.37	2679	0.14	0.35	8353	0.15	0.36
edugrad	2757	0.08	0.28	2917	0.07	0.25	2679	0.08	0.27	8353	0.07	0.26
edupostg	2757	0.09	0.29	2917	0.08	0.27	2679	0.1	0.3	8353	0.09	0.29
itexpcurrco	2757	2.59	2.64	2917	2.44	2.54	2679	2.61	2.77	8353	2.54	2.65
itexpotherco	2757	2.56	3.15	2917	2.07	3.07	2679	2.29	3.02	8353	2.3	3.09
totexp	2757	5.83	4.52	2917	5.14	4.62	2679	5.35	4.38	8353	5.43	4.52
age	2757	3.1	0.99	2917	2.95	1.01	2679	3.01	0.97	8353	3.02	0.99
male	2757	0.8	0.4	2917	0.76	0.43	2679	0.77	0.42	8353	0.78	0.42
foreign	2757	0.24	0.43	2917	0.21	0.4	2679	0.44	0.5	8353	0.29	0.45
firmsize	2757	2.44	0.69	2917	2.42	0.74	2679	2.58	0.91	8353	2.48	0.79

We find support for hypothesis 2a which predicted that foreign firms will pay more to their IT professionals than firms of Indian origin after controlling for education, experience and other demographic factors (see Columns 2 and 3 in Table 4). Foreign firms pay about 27.6% more than domestic firms (see Column 3 of Table 4). We find mixed support for hypothesis 2b which predicted that foreign firms will value MBA education and firm-specific IT experience more than the domestic firms. While foreign firms value MBA education less than domestic firms (see Column 3 of Table 4, also see Table 5), they value firm-specific IT experience more than Indian firms do (see Column 3 of Table 4, also see Table 5). In general, foreign firms value education much less than domestic firms do because the coefficients of all education variables are lower for foreign firms than they are for domestic firms in Table 5.

We do not find support for the Hypothesis 3a which predicted that firms value education more than experience in Indian context, more than they do in a developed economy. The 10.7% return on IT experience at other firms (compared with the 9.9% return on IT experience at the current firm, see Table 4) and the 7.5% return on general labor market experience enable us to compare the returns on IT experience with those on an MBA. The maximum salary increase that an IT professional can experience in the approximately two years that it takes to complete an MBA is 36.4% ($2[10.7 + 7.5]$) by switching his or her employer.¹ This return is higher than the return on an MBA compared to that on a bachelor's in engineering and is almost equal to that on a non-technical master's degree (i.e., edupostg). Thus, firms do not value MBA education much with respect to work experience at least for IT professionals who already have a bachelor's in engineering or a non-technical master's degree (i.e., edupostg). Only for a non-engineering bachelor's (i.e., edugrad, who are only 7% of IT professionals in our sample), it is economically attractive to pursue MBA in the Indian context. Overall, these results suggest that firms do not value

¹ We need to add back the returns to the general labor market experience (this is captured by the coefficient of total experience variable) to the returns to IT experience at other firms to calculate the opportunity cost of foregone work experience.

master's education in business more than experience in the Indian context for a large segment of IT professionals after considering the opportunity costs of education.

Table 3: Parameter Estimates of Compensation By Total Experience (Dependent variable is natural log of total compensation)

	(1)	(2)	(3)
	Upto 5 Years	5-10 Years	More than 10 Years
edubeng	0.669*** (0.105)	0.827*** (0.110)	0.770*** (0.078)
edumba	0.731*** (0.116)	1.008*** (0.180)	0.977*** (0.122)
edumtech	0.785*** (0.121)	0.904*** (0.124)	0.998*** (0.111)
edumca	0.638*** (0.106)	0.708*** (0.095)	0.708*** (0.106)
edugrad	0.345*** (0.090)	0.536*** (0.087)	0.261*** (0.075)
edupostg	0.562*** (0.113)	0.667*** (0.115)	0.629*** (0.083)
itexpcurco	0.174*** (0.034)	0.090*** (0.022)	0.043** (0.017)
itexpothco	0.141*** (0.024)	0.125*** (0.016)	0.077*** (0.009)
totexp	0.069* (0.038)	0.096 (0.108)	0.042 (0.026)
male	0.033 (0.029)	0.077** (0.030)	0.062 (0.044)
firmsize	-0.026 (0.048)	0.013 (0.072)	0.002 (0.072)
foreign	0.208** (0.103)	0.224* (0.118)	0.354*** (0.129)
firmsize X mba	0.143*** (0.050)	0.098** (0.041)	-0.052 (0.055)
firmsize X itexpcurco	0.026* (0.015)	0.010 (0.008)	0.020*** (0.007)
firmsize X itexpoth	-0.009 (0.012)	-0.007 (0.011)	-0.003 (0.006)
mba X foreign	-0.284** (0.107)	0.010 (0.094)	-0.350*** (0.126)
itexpcurr X foreign	0.034 (0.025)	0.033** (0.014)	0.010 (0.014)
itexpoth X foreign	0.025 (0.024)	-0.008 (0.015)	-0.000 (0.013)
Observations	4759	2411	1183
R-squared	0.41	0.37	0.44

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Note: These models include an intercept term, age, dummies for years, interaction terms involving MBA and IT experience at current firm and at other firms, and squared terms for total experience, IT experience at current firm, IT experience at other firms. Firm size is mean-centered in the interaction terms involving firm size, MBA and IT experience.

**Table 4: Parameter Estimates of Compensation of Indian IT Professionals
(Dependent variable is natural log of total compensation)**

	(1)	(2)	(3)
edubeng	0.818***	0.752***	0.730***
	(0.107)	(0.084)	(0.082)
edumba	0.832***	0.795***	0.819***
	(0.089)	(0.079)	(0.082)
edumtech	0.971***	0.884***	0.859***
	(0.136)	(0.103)	(0.100)
edumca	0.752***	0.695***	0.674***
	(0.103)	(0.084)	(0.081)
edugrad	0.426***	0.392***	0.382***
	(0.056)	(0.046)	(0.047)
edupostg	0.659***	0.624***	0.603***
	(0.100)	(0.085)	(0.083)
itexpcurco	0.104***	0.104***	0.094***
	(0.015)	(0.015)	(0.017)
itexpothco	0.112***	0.102***	0.102***
	(0.009)	(0.008)	(0.009)
totexp	0.074***	0.072***	0.072***
	(0.009)	(0.008)	(0.008)
male	0.052*	0.051**	0.051**
	(0.026)	(0.025)	(0.025)
firmsize		0.024	-0.023
		(0.037)	(0.036)
foreign		0.300***	0.244***
		(0.074)	(0.077)
firmsize X mba			0.087***
			(0.031)
firmsize X itexpcurco			0.020***
			(0.006)
firmsize X itexpoth			-0.003
			(0.005)
mba X foreign			-0.176***
			(0.065)
itexpcurr X foreign			0.023**
			(0.010)
itexpoth X foreign			0.004
			(0.009)
Observations	8353	8353	8353
R-squared	0.545	0.576	0.582

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Note: These models include an intercept term, age, dummies for years, interaction terms involving MBA and IT experience at current firm and at other firms, and squared terms for total experience, IT experience at current firm, IT experience at other firms. Firm size is mean-centered in the interaction terms involving firm size, MBA and IT experience.

**Table 5: Parameter Estimates of Total Compensation By Firm Type
(Dependent variable is natural log of total compensation)**

	(1)	(2)
	Domestic Origin Firms	Foreign Origin Firms
edubeng	0.751***	0.415***
	(0.085)	(0.097)
edumba	0.851***	0.298***
	(0.076)	(0.100)
edumtech	0.839***	0.596***
	(0.117)	(0.132)
edumca	0.713***	0.320***
	(0.082)	(0.080)
edugrad	0.392***	0.138
	(0.047)	(0.087)
edupostg	0.617***	0.329***
	(0.088)	(0.100)
itexpcurco	0.089***	0.135***
	(0.018)	(0.014)
itexpotheco	0.103***	0.086***
	(0.010)	(0.008)
totexp	0.072***	0.091***
	(0.009)	(0.017)
male	0.031	0.117***
	(0.031)	(0.020)
firmsize	0.019	-0.082**
	(0.047)	(0.038)
firmsize X mba	0.069	0.107***
	(0.050)	(0.034)
firmsize X itexpcurco	0.020***	0.007
	(0.007)	(0.008)
firmsize X itexpoth	0.002	-0.002
	(0.007)	(0.004)
Observations	5914	2439
R-squared	0.53	0.66

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Note: These models include an intercept term, age, dummies for years, interaction terms involving MBA and IT experience at current firm and at other firms, and squared terms for total experience, IT experience at current firm, IT experience at other firms. Firm size is mean-centered in the interaction terms involving firm size, MBA and IT experience.

We note significant heterogeneity of returns on MBA depending on the qualifications of the IT professionals in the comparison group (see Columns 1, 2 and 3 of Table 4).² Returns on MBA are positive and statistically significant when we compare MBAs with non-engineering bachelor's (i.e., edugrad, Wald test for differences in coefficients is statistically significant at $p < 0.05$) but economically negligible when compared with a

² Because of the presence of interaction terms involving MBA with firm type (e.g., foreign versus domestic and firm size), there is a need for caution in interpreting the coefficient of MBA in Column 3 of Table 4. The coefficient of edumba in Column 3 gives us returns on MBA for a domestic firm with the mean firm size. Returns on MBA are lower for foreign firms as the negative and statistically significant coefficient involving edumba and foreign shows.

bachelor's in engineering (i.e., edubeng). Returns on MBA are less than that on M.Tech (see Column 2 of Table 4, Wald test, $p < 0.05$) and comparable to that on MCA (Wald test, $p > 0.05$). In contrast to returns on MBA, returns on M.Tech are significant when compared with a bachelor's or any other master's degree.

We do not find support for hypothesis 3b, which predicted that firms will value IT experience at other firms more than they value IT experience at the current firm in Indian context. Although the coefficient of IT experience at other firms is higher than the coefficient of IT experience at current firm for domestic firms of mean firm size, the difference between the two coefficients is statistically insignificant (see Column 3 in Table 4; $p = 0.63$). Firms value IT experience at other firms at the rate of 10.7% per additional year ($= 100[\exp(0.102) - 1]$), and they value IT experience at current firm at the rate of 9.9% per additional year.³ Foreign firms value IT experience at current firm compared to that at other firms even more than domestic firms (see Column 3 of Table 4, also see Column 2 of Table 5).

Firms appear to value IT experience compared to non-IT experience very differently in India, than they do in the US. Note that our models include a variable for the total work experience and because we have already captured IT experience at current firms and other firms in two other variables, the correct way to interpret the coefficient of "total work experience" variable is view it as yielding returns to each additional year of non-IT experience. We find that one additional year of non-IT experience is associated with an increase of 7.5% in compensation. While the difference between coefficients of non-IT experience and IT experience at other firms is statistically significant, the difference between coefficients of non-IT experience and IT experience at current firm is statistically insignificant. On the whole, considering the magnitudes of the differences in coefficients, these results suggest that both IT and non-IT experience are valued highly in India (IT experience at other firms valued slightly higher than non-IT experience), a finding that differs from the finding in the United States (Mithas and Krishnan 2008).

Among some additional results, we find that male IT professionals earn 5.3% more than their female counterparts (see Table 4, Column 3). This finding is similar to findings of other studies that report gender gap in compensation for other types of workers in India (Kingdon 1998). As in the US, we do not find evidence for complementarities between an MBA and IT experience in India because, in general, the interaction terms involving these variables were economically not significant.

Discussion

Main Findings

This research provides several new insights by studying compensation of IT professionals who work with IT and IT enabled service providers located in India. First, the returns to MBA vis-à-vis other education grow favorably with respect to work experience suggesting that MBA degree is not used merely as a signal but is also associated with likely productivity improvements that pay off in the longer run. In addition, we find substantial heterogeneity in returns to an MBA for IT professionals in India. From an economic perspective and if one focuses only on salary as an outcome, while MBA degree provides attractive returns for those who have bachelor's degree other than engineering, it is much less attractive for other IT professionals with bachelor's in engineering or those who have a master's degree. This is quite unlike the case in the U.S. where MBA degree shows significantly higher returns compared to any other degree at bachelor's or master's level. Interestingly, results of this study suggest that the returns on M.Tech are significant when compared with a bachelor's or a master's.

Second, we find that foreign firms pay more to their IT professionals than firms of Indian origin. Interestingly, while foreign firms value MBA education less than domestic firms, they value firm-specific IT experience more than Indian firms do. One explanation for this finding may be that foreign firms may already be employing IT professionals with MBA in developed markets and therefore, they do not value MBA degree of IT professionals in India. Foreign firms may be using Indian employees primarily for their technical expertise not easily available elsewhere which reflects in foreign firms paying generally higher salary levels and valuing firm-specific IT experience more than the domestic firms.

³ Because of the presence of interaction terms involving IT experience with firm type (e.g., foreign versus domestic and firm size) an MBA and quadratic terms in experience, there is a need for caution in interpreting the coefficients of IT experience. The numbers in the text apply when interaction terms are zero (i.e., for a domestic firm with mean firm size) and ignoring the quadratic effects of experience.

Third, in contrast to U.S. where pursuing MBA is a financially attractive option for IT professionals, in India pursuing MBA is economically unattractive for a large segment of IT professionals because firms value IT experience quite highly thereby raising the opportunity cost of MBA.

Finally, the results on returns to experience in India are remarkably different from those in studies of IT professionals in the United States where firms value IT experience at other firms more than they value IT experience at current firm and where IT experience is valued significantly higher than the non-IT experience (Mithas and Krishnan 2008). Unlike in the United States, firms do not value general IT experience more than they do firm-specific IT experience in Indian context. The results showing comparable firm valuation for IT experience at other firms than at the current firm provide an economic explanation for the turnover culture in the IT profession in India. Interestingly, the valuation of the non-IT experience of IT professionals is significantly higher in India compared to that in the United States and is generally comparable to the valuation of IT experience in India.

Implications for Research

First, our findings lend greater support to the human capital view than the sorting view because returns to an MBA grow larger with work experience and IT experience only pays off in early stages of one's career. Both of these results are more consistent with human capital explanations which associate returns on human capital with productive capacity of such resources and not with sorting explanations which suggest that human capital variables merely proxy for unobserved characteristics that firms can not observe or use for hiring or compensation decisions. From a research perspective, there is a need to identify disaggregated dimensions of competencies and skills that MBA education provides which enhance the productive capacity of IT professionals.

Second, this study also suggests existence of segmented labor markets in Indian context. While foreign firms pay a premium to IT professionals compared to domestic firms, they value MBA less than the domestic firms. Interestingly, foreign firms pay higher premiums with growing work experience (see the coefficient of foreign variable in Table 4). On the whole, these results suggest that foreign firms do not merely go for cost reasons to emerging markets, they value experience that IT professionals bring and are willing to pay a premium to such professionals compared to domestic firms.

Third, this study suggests significant differences in returns on education and IT experience across US and India. These differences points to the usefulness of country-specific studies to document such differences to further theorize and understand the differences attributable to contextual factors such as development stage of a country, domestic or foreign firm origin, IT user versus IT service provider context, and firm size (see Ang and Slaughter 2000 for a discussion). Such studies are also important for testing the generalizability of findings from a particular country.

Finally, this study suggests that firm-specific skills may not be as important in IT-related occupations as previously thought and lends further credence to the recent findings in the context of a developed economy (Mithas and Krishnan 2008). Although firm-specific IT experience may have been important when firms used highly specific and legacy IT systems before 1995, this may have changed with the standardization of hardware platforms and the spread of standard software development methodologies and standards that have reduced the importance of firm-specific language, dialect, and informal team communications. In addition, as in other industries (Daveri and Maliranta 2007), faster knowledge depreciation because of technological advances makes IT professionals who move from firm to firm and gain greater exposure to different types of IT applications more valuable than the professionals who work in a single environment. Indeed, recent literature notes the trend away from internal labor markets toward international spot markets for labor, as evidenced in the offshoring of many IT-related jobs (Hirschheim et al. 2005; Mithas and Whitaker 2007).

Implications for Practice

Our study has implications for firms and individual IT professionals. First, the finding that returns to an MBA are more consistent with human capital theory than with sorting theory suggests that hiring of IT professionals based on their MBA educational qualification may have been efficient, so far. This may be because of screening criteria used by Indian educational institutions to select candidates and, in turn, firms exercising adequate controls in their recruitment processes. Our findings should not be taken to suggest that firms need not invest in testing

procedures and expensive interviewing practices to assess managerial skills; an MBA degree alone should not be used as a surrogate and an indicator for managerial skills.

Second, IT professionals can use our findings to make informed decisions with respect to their educational and career choices. For example, depending on their current educational background, IT professionals can assess the extent to which they will benefit by pursuing different types of degrees considering their opportunity costs. As they do so, they need to bear in mind that our study only looked at the consequences of MBA degree for compensation. Even if MBA degree does not provide a direct financial advantage, it may provide other benefits such as promotional opportunities, more challenging or interesting job assignments and these benefits should also be considered when making educational investment decisions. Our findings suggesting that foreign firms pay more to IT professional validate the notion that working for a foreign firm is not only more prestigious in Indian context, but it is also financially more rewarding. As for domestic firms, the implication is that if they want to attract and retain the best talent then they need to pay for it, else risk losing their employees to firms of foreign origin.

Finally, the findings of this study provide a benchmark for returns to education and IT experience that can be helpful for domestic and multinational firms located in India to assess their compensation practices. Because returns to education and experience appear to vary across countries and depend on educational endowments of employees, firms can use our findings to tailor their higher education programs for employees (Lunsford 2007). Unattractive returns on MBA with respect to bachelor's in engineering and other master's in a technical field provide an explanation for the reported shortage of IT professionals with business savvy in the Indian market (Weier 2007). They provide implications for firm's compensation policies and suggest that firms need to provide appropriate financial incentives to IT professionals if they want them to make investments in MBA education to improve their human capital and productive capacity which might eventually be to a firm's advantage.

Limitations and Suggestions for Further Research

Although this study contributes to a better understanding of the compensation of IT professionals in general and in the Indian context in particular, we identify two promising areas for further research. First, in addition to an MBA and IT experience, compensation may also depend on the behavioral competencies (e.g., customer interfacing skills) and certifications in specific areas such as IT security, databases or enterprise systems (Ramasubbu, Mithas and Krishnan 2008). It will be useful to assess the economic value of such competencies and certifications to inform decision-making of IT professionals for investments in such competencies and certifications. Our study draws attention to some associations, it will be useful to conduct a causal analysis using a counterfactual or potential outcomes approach for greater confidence in findings (Dehejia and Wahba 2002; Gregor 2006; Mithas and Krishnan 2009). In addition, because some level of IT competence is necessary for successful management of business processes across all functional areas (Dischinger et al. 2006), it will be useful to assess the extent to which IT competencies of business managers affect their compensation and other career outcomes.

A second opportunity for future research will be to assess the impact of compensation on job satisfaction, job search or retention propensity of IT professionals (McMurtrey et al. 2002). Such a line of enquiry should also consider the impact of other human resource initiatives such as training programs and provision of perks and benefits so that managers can assess the relative importance of these factors and evaluate them in economic terms for more cost effective and economically prudent decision-making to tailor their retention programs (Gerhart and Rynes 2003).

To conclude, this study investigates the effect of managerial and technical competencies on the compensation of IT professionals employed by the information technology and IT enabled service firms located in India. The study finds high returns on technical education but significant heterogeneity in returns on business education at master's level. The returns to IT experience and non-IT experience are significantly higher in India than in the U.S. and there is little evidence for firm-specific IT experience as being much more valuable than general IT experience. On the whole, returns on business education at master's level are not significantly higher than that on experience suggesting a lack of financial incentive to pursue business education at master's level. Among institutional effects, foreign firms pay significantly more to IT professionals than Indian firms. Further analysis indicates that while foreign firms value MBA education less than domestic firms, they value firm-specific IT experience more than Indian firms do. Because emerging markets such as India are a critical component of an organization's competitive strategy in a modern economy, these findings have important implications for firms to design competitive and effective compensation practices. They also have implications for IT professionals for their

career choices including mobility in labor markets and investments in their human capital that may also benefit firms.

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