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Beauty is in the Eye of the Beholder: Toward a Contextual Understanding of Compensation of IT Professionals Within and Across Geographies

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Abstract

How do multinational corporations (MNCs) and domestic firms compensate technical and managerial skills of knowledge workers within and across geographies? This paper answers this question by examining how developed economy MNCs and emerging economy firms value MBA education and firm-specific IT experience of IT professionals in India; and how developed economy MNCs value MBA education and firm-specific IT experience differently across India and the U.S. Our analyses of archival data on more than 20,000 IT professionals reveal two important findings. First, for IT professionals in India, the marginal effect of firm-specific IT experience on compensation is greater for developed economy MNCs than for emerging economy firms, and the marginal effect of MBA education is greater for emerging economy firms than for developed economy MNCs. Second, when we compare compensation of IT professionals employed by MNCs across India and the U.S., we find a greater marginal effect of firm-specific IT experience in India but a greater marginal effect of MBA education in the U.S. These findings suggest that the manner in which MNCs and emerging economy firms value and compensate IT professionals across geographies is consistent with their firm-level strategies and capabilities. The findings provide important insights on compensation of IT professionals within and across geographies based on firm national origin. These contributions are important to understand the broader context of compensation of IT professionals across firm national origin and geographies.

Keywords: MNC, multinational, global, human capital, information, technology, IT, experience, MBA, education, professional, compensation, emerging, developed, economy, arbitrage, knowledge work.

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1. Introduction

Multinational corporations (MNCs) globalize their value chains to source inputs from lower cost locations and leverage a global talent pool. Because the cross-border movement of labor faces higher restrictions than the cross-border movement of trade and capital (Freeman, 2006), developed economy MNCs have located operations in and sourced IT services from emerging economies such as India and China (Foerderer, Kude, Mithas and Heinzl, 2016, Huang, Tafti and Mithas, 2018, Liu and Aron, 2015, Mithas, Whitaker and Tafti, 2017). For example, while emerging markets accounted for only 6% of global foreign direct investment flows in 2001, that percentage increased to 25% by 2010 (Ramamurti, 2012). During the same period, the annual cap for new U.S. H-1B visas for high-skill professionals was reduced from 195,000 in 2001 to 65,000 in 2010.

Although prior Information Systems (IS) research has made important contributions to our understanding of globalization and offshoring, we know little about how MNCs compensate service professionals across geographies as part of their global service strategies. In particular, few studies have compared compensation of IT professionals across firms of different national origins, or compared compensation practices of firms across geographies. One way to infer the relative valuation of service professionals across geographies would be to perform comparative studies. However, most existing compensation research is set within a single developed economy (Mithas and Krishnan, 2008, Mithas and Lucas, 2010), single emerging economy (Du and Choi, 2010), or compares compensation across developed economies (Levina and Xin, 2007).

In this paper, we investigate how developed economy MNCs compensate firm-specific IT experience and MBA education by studying IT professionals in India and the U.S. We focus on firm-specific IT experience and MBA education, two of the most important human capital dimensions for IT professionals (Bassellier and Benbasat, 2004, Lee, Trauth and Farwell, 1995, Mithas and Krishnan, 2008, Slaughter, Ang and Boh, 2007), and make two sets of comparisons. First, we compare the marginal effect of firm-specific IT experience and MBA education on compensation of IT professionals in India between developed economy MNCs and emerging economy firms. Second, we compare compensation practices of developed economy MNCs across India and the U.S. To make these comparisons, we analyze data from surveys of 8,353 IT professionals in India and 11,808 IT professionals in the U.S.

This paper makes important contributions to research and practice. This is one of the first studies to investigate how emerging economy firms and developed economy firms value experience and education of IT professionals within a country, and how developed economy MNCs value experience of IT professionals across countries. We study global value chains in a services setting to complement prior global supply chain research in a manufacturing setting (Kraemer and Dedrick, 1998), and extend prior research on compensation of IT professionals in a developed economy (e.g., Mithas and Krishnan, 2008)

by comparing the value of MBA education and firm-specific IT experience between a developed economy and an emerging economy. We distinguish between compensation practices of developed economy MNCs and emerging economy firms to explore the role of firm national origin as called for in prior research (Levina and Xin, 2007). From a managerial perspective, we contribute to an improved understanding of how firms compensate experience and education of IT professionals in global locations to extend prior work (Ferratt, Agarwal, Brown and Moore, 2005, Joseph, Ng, Koh and Ang, 2007, Tambe and Hitt, 2010). Together, these contributions provide insights about the "missing context" of IT professionals (Ang and Slaughter, 2000).

2. Background and theoretical framework

2.1 Prior literature

We draw on and extend prior IS research in outsourcing, offshoring and human capital to deepen our understanding of compensation of IT professionals within and across geographies. One stream of IS outsourcing and offshoring research addresses the characteristics of business processes, occupations and corporate functions that are more likely to be outsourced, offshored and globalized (Han and Mithas, 2013, Liu and Aron, 2015, Mani, Srikanth and Bharadwaj, 2014, Mithas and Whitaker, 2007, Tambe and Hitt, 2012, Tanriverdi, Konana and Ge, 2007). This stream of research discusses the types of MNC positions and responsibilities that are placed in offshore locations and those that are retained at home country headquarters. For example, Clemons and Aron (2004) note that tasks that are "…explicit, algorithmic, dependent only on explicitly listed data, and computationally described…" are more easily offshored than tasks that are "…implicit, subjective, context-dependent and verbally described…" (p.12). Tambe and Hitt (2010) suggest that because "…employees in jobs requiring face-to-face contact or physical presence in a fixed location are less likely to be offshored", that makes "…interpersonal or managerial skills…increasingly valuable for IT workers" (p. 69).

A second stream of IS outsourcing and offshoring research addresses the requirements to structure and coordinate IT work across global locations (Aron, Clemons and Reddi, 2005, Bapna, Barua, Mani and Mehra, 2010, Kotlarsky, Scarbrough and Oshri, 2014, Liu and Aron, 2015, Whitaker, Mithas and Krishnan, 2011). For example, developed economy MNCs need to coordinate and configure value chain activities across different geographic locations to be responsive to various local markets (Mithas, Whitaker and Tafti, 2017), and need to design processes and mechanisms to ensure optimal performance. A third relevant stream of research addresses the human capital characteristics of IT professionals, technical and managerial requirements for IT positions, and compensation of IT professionals (Ang, Slaughter and Ng, 2002, Joseph, Boh, Ang and Slaughter, 2012, Mithas and Krishnan, 2008, Mithas and Lucas, 2010).

We draw on these three streams of research to identify relevant but understudied factors that may explain differences in compensation practices of developed economy MNCs and emerging economy firms in India and of MNCs in the U.S. We focus on India, an important emerging economy that accounts for 50% of the offshore IT and BPO market (Manning, Massini and Lewin, 2008, NASSCOM-McKinsey, 2005). The Indian IT and BPO industries employ 4.0 million workers directly, with explosive growth in exports from $4 billion in 2000 to $117 billion in 2017 according to the National Association of Software and Services Companies (NASSCOM). Also of interest to this study, the Indian IT industry includes significant India operations for MNCs headquartered outside India (such as Accenture and IBM) and firms headquartered in India (such as Infosys and TCS) (Dossani and Kenney, 2007). Research shows that U.S.-based multinational firms operating in foreign countries apply different business practices, including business practices related to human capital and IT, than do native firms (Bloom, Sadun and Van Reenen, 2012). To the extent that Indian firms have different business models, strategies and culture than developed economy MNCs operating in India (Cappelli, Singh, Singh and Useem, 2010), our study provides insights on how such differences manifest in their compensation strategies for IT professionals.

2.2 The context of compensation for IT professionals

Drawing on prior research (Carpenter, Sanders and Gregersen, 2001, Sanders and Carpenter, 1998),[1] we identify the most salient firm-level and employee-level factors that determine compensation for IT professionals. We focus on national origin as an important firm-level factor, because of differences in organizational policies, practices, values and norms across countries (Lau and Ngo, 1996). We make a distinction between MNCs based in developed economies and firms based in emerging economies (Hitt, Li and Worthington, 2005), because these firms compete against each other in emerging economies and are increasingly competing in developed economies (Whitaker, Melville, Plice and Dedrick, 2010).

Among employee-level factors, we focus on firm-specific IT experience and MBA education. Although prior research shows that these are two of the most important human capital dimensions for IT professionals (Mithas and Krishnan, 2008), we articulate here why focusing on these two dimensions is relevant to understand compensation practices of firms within and across geographies.

We focus on firm-specific IT experience rather than generic IT experience, because firm-specific IT experience goes beyond foundational technical knowledge to help IT professionals understand where and how to deploy IT effectively to achieve the organization's strategy (Byrd and Turner, 2001). Firm-specific IT experience gives IT professionals an understanding of the organization's context, goals and

[1] While employee factors such as age and gender and location characteristics such as national culture are relevant determinants of compensation, those determinants have been extensively covered in prior research (Dreher and Cox, 1996, Gerhart and Milkovich, 1990, Schuler and Rogovsky, 1998). This paper focuses on understudied dimensions to enrich our understanding. In the online Appendix, Table A1 shows key contributions of this paper with respect to prior research.

objectives, policies and procedures, core capabilities, and critical success factors (Bassellier and Benbasat, 2004). Firm-specific IT experience enables IT professionals to build and sustain effective relationships with IT users in the firm's functional units (Slaughter, Ang and Boh, 2007). Our focus on firm-specific IT experience is consistent with the consensus in labor economics research that firms are more likely to reward firm-specific human capital than general human capital. Manning (2011) notes: "*A key and eminently sensible idea in the specific human capital literature originating in Becker…is that specific human capital accumulates over time. This means that rents in the employment relationship are likely to be higher for those workers who have been in their current job for a long time–very few labor economists would dissent from this position*" (p. 977). Firm-specific IT experience has been noted in the work of Sandra Slaughter and other researchers (Mithas and Krishnan, 2008, Mithas and Lucas, 2010, Slaughter, 2014, Slaughter, Ang and Boh, 2007). For example, Slaughter, Ang and Boh (2007) note the value of technical experience for IT professionals "*…the application of IT to a specific organization's business problems involves a high degree of tacit knowledge about organizational systems, structures, members, and procedures, and tacit skills about handing people and negotiating organizational politics. This knowledge and associated skills mostly are firm-specific and are best acquired at the particular organization*" (p. 375). Slaughter et al.'s (2007) findings show that firm-specific human capital influences compensation and IT compensation-organizational tenure profiles. This firm-specific experience gives IT professionals an understanding of the strategies, processes and technologies of the firm (Castanias and Helfat, 1991), which in turn equips IT professionals with the ability to make more effective decisions in the best interests of the firm (Mayer, Somaya and Williamson, 2012).

We focus on MBA education because it can enable IT professionals to understand the business context beyond the individual organization. IT professionals benefit from their understanding of the enterprise including business processes, functional areas, and the enterprise-wide relationship among business processes and functional areas (Lee, Trauth and Farwell, 1995, Mithas and Lucas, 2010). Such knowledge enables managers to better conceptualize the corporate history, culture, and internal strengths and weaknesses, which can lead to more effective management of the firm (Castanias and Helfat, 1991). Managerial knowledge enables IT professionals to work effectively across departments and with external customers and suppliers (Gallagher, Kaiser, Simon, Beath and Goles, 2010).

We consider the context of IT professionals working for MNCs in India and the U.S., and the context of IT professionals working for domestic firms in India, to motivate our analyses and use our findings to suggest likely mechanisms and inform further research. We first discuss compensation differences of IT professionals between developed economy MNCs and emerging economy firms in India, and then discuss differences between MNCs in India and the U.S., focusing on the marginal returns to firm-specific IT experience and MBA education.

2.2.1 Compensation of IT professionals in India by developed economy MNCs and emerging economy firms

There are at least two reasons why developed economy MNCs may value firm-specific IT experience and MBA education differently than emerging economy firms. First, MNCs find emerging markets to be an attractive location to source IT talent because of the lower cost of IT professionals in these markets, coupled with the availability of a large pool of technically-qualified professionals. To succeed in emerging economies, developed economy MNCs must be able to bundle their firm-specific advantages (such as cutting-edge technologies and global brands) with complementary local resources available in the emerging economies (Hennart, 2012). India possesses the complementary resources to foster a technical workforce to attract MNCs to locate some technical operations in India. India has made substantial investments in national education to support science and engineering human capital (Manning, Massini and Lewin, 2008), and enabled the creation of university-affiliated software engineering schools to increase the number of IT graduates (Farrell, Laboissière and Rosenfeld, 2006). As a result of these human capital investments, India produces the 2nd highest number of science, technology, engineering and math (STEM) graduates of any country in the world (McCarthy, 2017).

Second, developed economy MNCs view emerging markets as an attractive location for IT work because of a significant advantage to scale their back-end technical operations, while they can rely on IT professionals in developed economies for front-end sales and marketing activities. Developed economy MNCs are distinctive in their ability to transplant management styles and other features of their organizational form abroad to coordinate managerial skills in the home country with technical skills in the host country (Bloom and Van Reenen, 2010). Developed economy MNCs leverage employees in emerging economies to apply their firm-specific knowledge and skills to protect and improve the MNC's intellectual property (Bruche, 2009). For example, Adobe has 30% of its global research and development (R&D) staff in India, and Intel has its 2nd largest R&D center in India. However, this dynamic for compensation of firm-specific IT experience does not apply when it comes to MBA education. Emerging economy firms compete based on their ability to produce lower priced services using lower cost labor (Ramamurti, 2012). Because emerging economy firms can only source managerial talent affordably from the local market, they may value MBA education in that market differently compared to developed economy MNCs.

Consistent with this discussion, we expect that the marginal effect of firm-specific IT experience and MBA education (compared to that of a Bachelor of Engineering degree) on compensation will be different for IT professionals in India between developed economy MNCs and emerging economy firms.

2.2.2 Compensation of IT professionals by developed economy MNCs across India and U.S.

There are also reasons why marginal returns on firm-specific IT experience and MBA education may differ between IT professionals working for developed economy MNCs in India and IT professionals working in the U.S. While MNCs may locate some technical operations in and source some IT services from India and other emerging economies, they typically retain many non-routine tasks at headquarters in the home country, because headquarters holds the patents, blueprints, procedures, trademarks and marketing assets to maximize knowledge capital (Hansson, 2005), and headquarters managers possess the trade secrets, customer lists, strategic plans, and knowledge of specific processes to maximize these assets (Sturman, Walsh and Cheramie, 2008). Because developed economy MNCs have to coordinate global human resources to respond to local needs in each market, they may value firm-specific IT experience and MBA education in the U.S. differently than in India.

For firm-specific IT experience, prior research suggests that U.S. multinational firms operating in another country are more IT intensive than non-U.S. multinational firms or domestic firms operating in that country, and also obtain higher productivity from IT assets compared with non-U.S. multinational firms or domestic firms (Bloom, Sadun and Van Reenen, 2012). Some studies argue that U.S. multinational firms may be better able to exploit IT using IT professionals because of their superior personnel management practices (Bloom, Genakos, Sadun and Van Reenen, 2012). In turn, the higher productivity for U.S. multinational firms enables U.S. multinational firms to compensate firm-specific IT experience in the emerging economy more highly.

For MBA education, 84 of the 2018 *Financial Times* top 101 Global MBA programs are based in North America or Western Europe (FT.com, 2018), and eight are based in India or mainland China. While are some promising developments for universities in emerging economies, MBA education in emerging economies has not yet achieved the stature of MBA education in developed economies. For example, a survey of 83 HR managers for developed economy MNCs that operate in emerging economies and serve developed economies indicates that only 10% of graduates from Indian universities would be qualified for generalist positions at developed economy MNCs, due to a lack of teamwork and interpersonal skills and an emphasis on theory rather than practical knowledge (Farrell, Laboissière and Rosenfeld, 2006).

Consistent with this discussion, we expect that the marginal effect of firm-specific IT experience and MBA education (compared to that of a Bachelor of Engineering degree) on compensation for IT professionals working for developed economy MNCs will be different in India than in the U.S.

3. Methods

3.1 Data

A major strength of this study is the use of two datasets from India and the U.S. for a comparable time period. We used similar and comparable questions across the datasets to construct the variables.

The first dataset on IT professionals in India comes from three national surveys conducted by a leading Indian market research firm from 2005 – 2007. The research firm conducted the surveys in two phases each year, and we illustrate the process for data collection by using specific figures from the 2006 survey (the research firm used a similar process for 2005 and 2007). In the first phase, the research firm sent out a detailed HR questionnaire to 250 IT companies in India. The IT companies in this study include firms that provide IT services (such as IBM and TCS) and firms that engage in technology-related product design and development (such as Honeywell Technology and WeP Peripherals). These companies include both Indian firms and developed economy MNC operations in India. Our sample does not include IT back office centers of non-IT firms, or of technology start-ups in India. For each firm, we classified the firm origin (*developed economy MNC or emerging economy firm*) based on country headquarters, as indicated by the Centre for Monitoring the Indian Economy (CMIE) database, Bloomberg, corporate websites and other information sources. We coded each firm as a service or product (*software product or hardware product*) firm based on the firm's primary offering as specified by Dun & Bradstreet, Bloomberg, corporate websites and other information sources. Fifty-one of the 250 companies participated in the first phase, for a 20% response rate. The research firm then selected the top 32 firms based on firm size and growth for a second phase employee survey. The research firm took steps to ensure that management did not influence the selection of respondents or their responses, and promised confidentiality to respondents. Continuing with 2006 as an example, 2,917 IT professionals from 32 firms responded to the survey, of which 2,060 were employees of Indian firms and 857 were employees of developed economy MNCs in India. Each IT professional provided data on their compensation and employer.[2] The research firm followed a similar process and received similar response rates in all three years.

A total of 8,353 Indian IT professionals from 51 firms responded to the 2005 – 2007 surveys. We believe the respondent profile in these surveys is a reasonable representation of IT professionals working for large firms in India. Because of the large number of participating firms and the large number of employees at those firms, along with the study design that randomly picks employees from participating firms, we expect a negligible amount of overlap in respondents across years.

The second dataset comes from surveys of IT professionals in the U.S. conducted by *InformationWeek* magazine and affiliated publications from 2005 – 2006. *InformationWeek* conducted a survey of U.S. IT professionals each year from 1998 – 2014 with a total of 240,000 responses during this timeframe. To our knowledge, this is the largest and most complete source of compensation information for U.S. IT professionals for this period. Similar *InformationWeek* data has been used in previous studies to answer different research questions (Mithas and Krishnan, 2008, Mithas and Krishnan, 2009, Mithas

[2] Table A2 in the online Appendix provides the list of companies in our sample.

and Lucas, 2010). *InformationWeek* designed the 2005 and 2006 surveys with the global HR consulting firm Hewitt Associates (now Aon Hewitt) and administered surveys through the Internet. At its peak the print edition of *InformationWeek* reached over 400,000 subscribers, and *InformationWeek* publicized the survey multiple times in multiple formats during the last part of each calendar year leading up to a January deadline. *InformationWeek* mentioned the survey in its daily electronic newsletter and included a link to the survey, sent specific follow-up e-mails to mention the survey also including a link, and publicized the survey in its print edition (*InformationWeek* became an online-only publication in 2013). After the survey deadline in January, survey results were tallied and reported by *InformationWeek* in articles and reports during the Spring.

In the two years 2005 and 2006, 11,808 U.S. IT professionals responded to the survey. While it is difficult to assess the response rate of an Internet survey, we believe the respondent profile in the *InformationWeek* surveys is a reasonable representation of U.S. IT professionals, because survey respondents cover all major IT job titles and U.S. states.

Table 1 provides a description of variables and Table 2 provides descriptive statistics for the U.S. and India data.[3] Table 2 shows some interesting similarities and differences in the U.S. and India data. For similarities, the educational profile of IT professionals is similar between two data sets, including the percentage of IT professionals with an MBA (6% in India, 7% in U.S.), the percentage with a Bachelor's degree (49% Bachelor of Engineering in India, 46% Bachelor's in U.S.), the percentage with a Master's degree (21% with a Master of Technology or Master of Computer in India, 17% with a Master's degree in the U.S.).[4] Both data sets have a high proportion of male IT professionals (78% in India, 84% in U.S.), and both sets of IT professionals have an equal ratio of firm-specific IT experience to general IT experience. The main difference between the data sets is that the professional experience of U.S. IT professionals is greater than that for India IT professionals along every dimension, including firm-specific IT experience (2.54 years in India, 7.21 years in U.S.), general IT experience (2.30 years in India, 7.76 years in U.S.), and total experience (5.43 years in India, 20.26 years in U.S.). Consistent with the difference in professional experience, the average age of IT professionals in our data is greater in the U.S.

[3] In the online Appendix, Table A5 provides correlations for the India data, and Table A6 provides correlations for the U.S. data.

[4] In the online Appendix, Tables A3.1 and A3.2 provide more detailed descriptive statistics for IT professionals in India, Table A3.3 provides year-wise descriptive statistics for IT professionals in the U.S., and Table A4 compares descriptive statistics of IT professionals in India in this paper with descriptive statistics of IT professionals in India in another recent publication. There are differences in nomenclature for degrees in the U.S. and India. In India the 'Graduate' degree refers to a degree that is equivalent to a U.S. Bachelor's degree, and in India the 'Post Graduate' degree is equivalent to a U.S. Master's degree.

than in India (28.10 years in India, 42.14 years in U.S.).[5] As expected because of the labor cost differences between countries, the average compensation level is substantially higher in the U.S. compared with India (554,000 rupees equivalent to $12,043 in India at an exchange rate of 46 Rps. = $1 U.S., $74,088 in U.S.).

3.2 Empirical models

Following previous research in labor economics (Krueger, 1993) and IS (Kim, Mithas, Whitaker and Roy, 2014, Mithas and Krishnan, 2008, Mithas and Krishnan, 2009, Mithas and Lucas, 2010), we specify standard cross-sectional log-linear earnings models. Let W represent annual compensation of the respondent, X_1 a vector of education- and experience-related endowments for the respondent, X_2 a vector of demographic characteristics for the respondent, and Z a vector of observed characteristics for the firm, respectively.

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

where α, β, and γ are parameters to be estimated, and ε is the error term associated with observation i. We estimate Equation 1 by ordinary least squares.

Our empirical models consider the human capital and productive competencies of professionals using multiple variables related to education and experience. Our use of variables for experience and education is consistent with over 75% of papers in a meta-analytic review of human capital research (Ng, Eby, Sorensen and Feldman, 2005). We use granular measures to represent a broader range and gradation of education and experience (Crino, 2008).[6] We include firm national origin in our analysis of the India data because we expect differences in compensation based on whether IT professionals work for a developed economy MNC or an emerging economy firm. We control for age and gender to account for demographic variables that influence compensation of IT professionals (Joseph, Ang and Slaughter, 2008). Consistent with prior labor economics research, we control for squared terms of firm-specific IT experience, general IT experience at other firms, and total experience (Krueger, 1993). We control for firm size to account for potential differences in labor quality based on firm size (Brown and Medoff, 1989), and we include a variable for each year to control for general unemployment levels and other labor market demand factors.

Table 3 shows empirical results for IT professionals in India and the U.S. Figure 1 shows the results for IT professionals in India by computing the compensation premium for firm-specific IT

[5] Because Age appears as a bracketed variable in our data set for India, the mean value of 3.02 is just above the 3.00 scale value that corresponds to the 26–30 year range. We interpret this mean value to infer that the mean age of workers in our sample is about 28 years old. Firm size also appears as a bracketed variable in our data set.

[6] In the online Appendix, Table A7 provides a comparison listing of variables in this paper with variables used in other compensation research.

experience and MBA education.[7] The explanatory power of our models as measured by overall R-squared values is reasonable and comparable to prior research (Krueger, 1993). We report heteroskedasticity-consistent standard errors in our models. We calculated variance inflation factors (VIF) for our main models and found average VIFs to be less than 5.

4. Results

We first report results on how developed economy MNCs value firm-specific IT experience and MBA education differently than emerging economy firms in India. We find that the marginal effect of firm-specific IT experience on compensation for IT professionals in India is greater for developed economy MNCs than for emerging economy firms (see the coefficient of firm-specific IT experience in Columns 1 and 2 of Table 3). A formal Wald test shows a statistical difference between the two coefficients ($p > \text{chi}^2 = 0.002$). We also performed an analysis using an interaction term of MNC and firm-specific IT experience for the full sample of firms, and obtained similar results. This finding suggests that developed economy MNCs source firm-specific IT experience from India where that experience is available and supported by complementary resources, and pay a premium compared with Indian firms for each year of firm-specific IT experience.

We find that the marginal effect of MBA education (compared to that of a Bachelor of Engineering degree) on compensation of IT professionals in India is greater for emerging economy firms than for developed economy MNCs (see the coefficient of MBA vis-à-vis Bachelor of Engineering in Columns 1 and 2 of Table 3). A formal Wald test shows a statistical difference between the two coefficients ($p > \text{chi}^2 = 0.000$). We also performed an analysis using an interaction term of MNC and firm-specific IT experience for the full sample of firms, and obtained similar results. One explanation for this finding is that MNCs maintain many managerial responsibilities at headquarters where those responsibilities are supported by a strong management education system and other complementary resources, and as a result have a lower demand for MBA education in emerging economies. For IT professionals in India, the returns to an MBA compared with every other degree are lower for employees of developed economy MNCs than for employees of Indian firms.[8]

Turning to differences in marginal returns on firm-specific IT experience and MBA education between IT professionals working for developed economy MNCs in India and those working in the U.S.,

[7] In the online Appendix, Table A8 shows the results of Table 3 for IT professionals in India and the U.S., by computing the compensation premium for firm-specific IT experience (row 1) and MBA education (rows 2 – 3).
[8] While it is possible that technical undergraduates from India may prefer an MBA or technical Master's degree in the U.S. compared with a technical Master's degree in India, not all families in India have the resources or inclination for their children to pursue education in the U.S. Although emerging economy firms have started to hire more workers in developed economies, they still rely more heavily on workers with MBAs in India relative to MBAs in developed economies, which may explain why emerging economy firms may need to pay a premium for MBA education in their home countries to obtain the best-available managerial labor.

we find that the marginal effect of firm-specific experience for IT professionals is greater in India than in the U.S. We make this inference based on results in Table 3 and Figure 1. As shown in Figure 2, developed economy MNCs pay a larger compensation premium for each year of firm-specific IT experience in India than in the U.S. (14.3% vs. 2.5%).[9] On average, IT professionals in India experience greater marginal returns to firm-specific IT experience compared with IT professionals in the U.S.

We also find that the marginal effect of MBA education for IT professionals is greater in the U.S. than in India. As shown in Figure 2, firms pay a 20.5% premium to IT professionals in the U.S. for an MBA compared with a Bachelor's degree, and an 8.4% premium for an MBA compared with a non-business Master's degree. While IT professionals in the U.S. earn a compensation premium for an MBA, IT professionals in India employed by developed economy MNCs experience a 23.0% compensation *deficit* for an MBA compared with a Master of Technology degree, and no statistically-significant difference in compensation for an MBA compared with a Bachelor of Engineering degree.

We performed additional exploratory analyses to assess the potential for endogeneity due to any missing or confounding variable(s) in our data. Consistent with Frank (2000) and other IS research that uses this approach to rule out concerns due to endogeneity (Huang, Tafti and Mithas, 2018, Kim, Mithas, Whitaker and Roy, 2014), we assessed the robustness of our results by calculating the threshold at which the impact of an unobserved confounding variable would be large enough to make our focal variables become insignificant. Frank (2000) provides an index called impact threshold for a confounding variable (ITCV) to quantify the impact of a confounding variable on the inference of a regression coefficient. For our model in column 1 of Table 3, the ITCV is 0.29 for MBA education. For our model in column 2 of Table 3, the ITCV is 0.21 for firm-specific IT experience. This means that the coefficients associated with firm-specific IT experience and MBA education would lose statistical significance only when the impact of an omitted confounding variable is greater than 0.21 or 0.29, respectively. For this value of ITCV, the partial correlation after controlling for current covariates between the confounding variable and firm-specific IT experience would need to exceed 0.46 for our main results to be called into question. Similarly, the partial correlation after controlling for current covariates between the confounding variable and MBA

[9] Because we include variables for firm-specific IT experience and general IT experience, the correct way to interpret the total work experience variable is as returns to each additional year of non-IT experience. Similarly, the coefficient of total IT experience indicates returns to each year of general IT experience at other firms after accounting for firm-specific IT experience. Note that because we have a total experience variable in our models, and our models also include variables for firm-specific and general IT experience, the difference between total experience and (firm-specific experience plus general IT experience) can be construed as a proxy for returns on 'managerial experience.' However, it is hard to parse out 'firm-specific managerial experience' in our data because for IT professionals, their firm-specific experience is generally viewed as firm-specific IT experience (see Mithas and Krishnan, 2008, Slaughter, Ang and Boh, 2007). We thank an anonymous reviewer for this discussion and suggestion of an opportunity for further research to measure 'firm-specific managerial experience' for IT professionals.

education would need to exceed 0.54 for our main results to be called into question. These partial correlations are large in comparison to the zero-order correlations in our data between firm-specific IT experience, MBA education and other explanatory variables, and large enough to exclude the possibility that an omitted variable could significantly alter the importance of our focal variables such as firm-specific IT experience and MBA education. The impact values of control variables are substantially smaller than the ITCV value, indicating that an omitted variable would need to exert a stronger impact than all the observable control variables to overturn the results, which is unlikely since we control for most variables that are common in labor economics research. Because our models are fairly rich with interaction terms, quadratic terms, and an array of labor economics control variables, this further alleviates concerns due to endogeneity which can be more of an issue in simpler models where the focus is on the treatment effect of one variable.[10] In our study, endogeneity is unlikely to provide an alternative explanation for the findings we observe.

We conducted additional analyses to generate further insights by splitting our sample of developed economy MNCs and emerging economy firms into product vs. service firms, because these firms may have different strategies and business models that could drive their compensation strategies for IT professionals.[11] We find that both product and service developed economy MNCs value firm-specific IT experience more than their emerging economy counterparts do, and that both product and service developed economy MNCs value MBA education less than their emerging economy counterparts do. Figure 3 shows these results. Note that we observe a negligible value for firm-specific IT experience by emerging economy product firms in Figure 3. One senior manager offered a plausible explanation for this finding, by stating that IT professionals find Indian product firms that cater to the Indian market to be a less attractive place to work than IT services firms such as Infosys that have a global footprint and customer base.

We also looked for any systematic differences in the type of technical work that is offshored to India vis-à-vis managerial work. While large publicly-traded firms are not required to report their offshoring activities, we used insights from prior research (Apte and Mason, 1995, Liu and Aron, 2015, Mithas and Whitaker, 2007) for the types of positions that are most likely to be offshored. Apte and Mason (1995) and Mithas and Whitaker (2007) classify occupations based on three characteristics

[10] Also note that that the mere presence of endogeneity does not always bias the coefficients of interest. For example, Tambe and Hitt (2012) suggest that effects of endogeneity are not always significant, and they actually found those effects to be "relatively small" (p. 599). The bias may even be negligible for studies such as ours that use more complex models. In another study, Tambe, Hitt and Brynjolfsson (2012) note: "*...key estimates, based on the three-way complementarity among IT, external focus, and decentralization, are less subject to bias than our main effect estimates because any biases that affect the complementarity term must be present only at the confluence of all three of these factors, but not when factors are present individually or in pairs*" (p. 851).

[11] See Table A9 in the online Appendix.

[information intensity, physical presence, customer contact] and then identify the global disaggregation potential of each occupation [low, medium, high]. Occupations with high disaggregation potential are most likely to be offshored to emerging economies, and occupations with low disaggregation potential are most likely to be retained in developed economies. We compared a managerial IT occupation (Computer and Information Systems Managers, Bureau of Labor Statistics (BLS) occupation code 11-3021) with a technical IT occupation (Computer Programmers, BLS occupation code 15-1131) for our analysis. Theoretically, Computer and Information Systems Manager positions are more likely to be retained in developed economies, and Computer Programmer positions are more likely to be offshored to emerging economies based on the disaggregation potential of these occupations. We then studied employment growth and wage growth for these occupations from 2000 – 2015 using BLS data, because this timeframe should be long enough to overcome any anomalies that may occur during a short period.

The BLS data supports our arguments that managerial IT positions are more likely to be retained in developed economies and are more likely to experience higher wage increases. As shown in Figure 4, total employment for Computer and Information Systems Managers increased 20% from 283,480 in 2000 to 341,250 in 2015, and wages increased 76% from $80,250 to $141,000 during the same timeframe. In contrast, employment for Computer Programmers *declined* 45% from 2000 – 2015, and wages for computer programmers increased 38% from 2000 – 2015, only half the rate of increase for manager positions. It is likely that the decline in Computer Programmers jobs is partly attributable to offshoring, and the competitive pressures of offshoring may explain relatively flatter wages for programmers. The explanation that there is likely to be greater wage pressure on jobs that are more codifiable and more algorithmic (Liu and Aron, 2015, Mithas and Whitaker, 2007, Tambe and Hitt, 2010) is consistent with our argument that managerial skills acquired through MBA education in the U.S. may be less affected by trade and offshoring. While we acknowledge that other influences such as automation could be at work, the evidence from BLS data supports the arguments and findings in this paper.

5. Discussion

5.1 Main findings and likely mechanisms

Our goal in this study is to compare the marginal effects of firm-specific IT experience and MBA education on compensation for IT professionals in India by developed economy MNCs and emerging economy firms, and to compare the marginal effects of firm-specific IT experience and MBA education on compensation for IT professionals in India and the U.S. by developed economy MNCs. We use data for 8,353 IT professionals in India and 11,808 IT professionals in the U.S. to generate new insights. Our findings point to some likely mechanisms for compensation of IT professionals considering their geographic context and firm national origin, and to suggest opportunities for future research on knowledge work. Our discussion here is informed by our conversations and interviews with industry

executives. For example, we interviewed a current executive for a global emerging economy IT service provider's operations in the U.S. who earned a Bachelor's in Engineering in India, an MBA in the U.S., and went to work in India before returning to the U.S. in 2016. We also interviewed a former HR executive with 30 years of experience at a Fortune 200 firm with 150+ foreign subsidiaries in 30+ countries on six continents, including all four BRIC countries (Brazil, Russia, India, China), nine other emerging economies, and two frontier economies as classified by MSCI. Besides drawing on our related research on IT professionals in India, Germany and the U.S. (Foerderer, Kude, Mithas and Heinzl, 2016, Mithas and Krishnan, 2008) and dozens of conversations with many executives over time, we also draw on prior published research to surface the context of compensation for IT professionals.

Among our first set of findings, we find that the marginal effect of firm-specific IT experience on compensation for IT professionals in India is greater for employees of developed economy MNCs than for employees of emerging economy firms. However, the marginal effect of MBA education (compared to that of a Bachelor of Engineering degree) on compensation for IT professionals in India is greater for emerging economy firms than for developed economy MNCs.

One explanation for these findings may be that MNCs view emerging economies such as India to be attractive for a large pool of IT talent at a lower cost than is available in developed economies. For example, in 2004 the annual labor cost for an IT services professional in the U.S. was $43,000 and the cost for a comparable IT services professional in India was $6,000 (in dollar terms) (Dossani and Kenney, 2007). Even with subsequent wage increases in India, the average annual salary for IT professionals in India ranges from $6,500 – $13,000 (Roy and Marriott, 2011), still significantly less than IT professionals in the U.S.

This difference in factor costs provides developed economy MNCs with an arbitrage opportunity where they can source lower cost labor from emerging economies and use the labor where it can earn the highest return (Gefen and Carmel, 2008). MNCs can pay a premium for IT professionals in India with a standard technical degree such as Bachelor of Engineering, and still save money compared with the cost of hiring these types of professionals in developed economies. If the superior quality of MBA education in the U.S. drives greater marginal value of MBA education in the U.S., then one might argue that this logic should extend to technical workers since technical education is better in the U.S. than in India. However, the theory of comparative advantage explains why labor markets such as India and the U.S. can differ in marginal returns to various skills even if the U.S. has an absolute advantage in both MBA and technical education (Bhagwati, Panagariya and Srinivasan, 2004, Samuelson, 2004). For example, Simon (1960, p.25) notes "*…if computers are a hundred times faster than executives in making investment decisions, but only ten times faster in handling employee grievances…, then computers will be employed in making investment decisions, while executives will be employed in handling grievances*." This is true

even if computers have an absolute advantage in both making investment decisions and handling grievances. In our context, even if the U.S. may have higher quality MBA education and higher quality technical education, the theory of comparative advantage suggests that firms would still be better off leveraging arbitrage opportunities and differences in labor costs across markets.

This arbitrage opportunity can also be viewed as a competitive response of developed economy MNCs to Indian firms who already source most technical labor from India (Ghemawat, 2007). MNCs can utilize these IT professionals to scale their technical operations by leveraging firm-specific IT experience of employees in India to develop new and innovative products and services for local or global markets. This technical manpower in India can be complemented by managerial talent at MNC headquarters, which may explain why MNCs do not pay as large of a premium for MBA education in emerging economies as for firm-specific IT experience in emerging economies.

While the business model of developed economy MNCs is based on maximizing the value of corporate assets such as R&D or brands (Tafti, Sachdev, Mithas and Mallik, 2015), the business model of emerging economy firms depends on maintaining low cost operations. For emerging economy firms, managing customer projects on time and within budget is more important than leveraging firm-specific IT experience or nurturing intellectual property that are more salient for developed economy MNCs. Kris Gopalakrishnan, a co-founder of Infosys, noted in a keynote address at Indian Institute of Management Bengaluru in 2017 that Indian IT firms typically budget 4% of revenue on training as part of their business model, and are willing to invest in their own education, training and facilities to make up for the absence of such initiatives from the government. An executive we interviewed suggested that for emerging economy firms "customer project management is the IP," and this type of intellectual property does not require as much firm-specific IT experience as would be needed to develop new high-margin products and services.

Among our second set of findings, we find that the marginal effect of firm-specific IT experience is higher for IT professionals employed by developed economy MNCs in India than for IT professionals in the U.S. However, the marginal effect of MBA education on compensation is greater for IT professionals in the U.S. than for IT professionals employed by developed economy MNCs in India. These findings suggest that MNCs value and compensate firm-specific IT experience more highly in India than in the U.S. because of the significant difference in baseline labor costs across markets, and the ability of MNCs to recoup their investments in firm-specific IT experience in India by selling higher-margin products and services in developed markets.

One explanation for these findings may be that although emerging economy firms are not willing to match compensation levels offered by MNCs because emerging economy firms have cost-focused strategies, the competition for talent still drives up the overall valuation of firm-specific IT experience in

India. By contrast, because overall wages are high in the U.S. relative to India, the marginal returns on firm-specific IT experience are generally lower in the U.S. than in India.[12] This finding is consistent with the observation that as routine technical positions migrate to emerging economies, the rate of employment growth decreases for routine technical positions in developed economies. For instance, employment in U.S. service positions most susceptible to offshoring increased only 0.4% per year from 2001 – 2007, compared to 1.3% annual growth for all service occupations and 1.8% annual growth for service positions least susceptible to offshoring (Moncarz, Wolf and Wright, 2008). Another study estimates that offshoring reduced low-skill service employment by 0.4% and medium-skill service employment by 0.1% (Crino, 2008). When IT professionals in developed economies face increased competition from IT professionals in emerging economies, this reduces the marginal return and places downward pressure on wages for technical experience in developed economies (Antràs, Garicano and Rossi-Hansberg, 2006). Because there are significant wage differences in absolute dollar terms between the U.S. and India for similar skills, MNCs in India have much greater room to reward firm-specific experience, particularly when they face competition for top talent from local Indian firms. Similar pressures may be less relevant in the U.S., particularly with alleged collusion in hiring practices among technology employers (Streitfeld, 2015), which may explain why the difference between firm-specific and general IT experience is not as high in the U.S. It is also likely that the mere threat of offshoring jobs with strategic value may depress marginal returns for firm-specific experience in the U.S. (Rodrik, 1997). Although in theory, firms in the U.S. may benefit from wage arbitrage, that alone may not lead firms to compensate U.S.-based employees more highly if firms direct such surpluses to shareholders through dividends or share buybacks. We note that shareholder activism is a much stronger force for U.S. firms than is employee bargaining power. In addition, anecdotal reports suggest that older IT workers in the U.S. are disproportionately laid off because they are at higher wage levels (Matloff, 2003), although caution is needed to interpret such anecdotal reports because these reports also suggest that foreign workers are inferior or cheaper which does not comport with findings of other academic studies that report contrary results (Mithas and Lucas, 2010). If older workers are replaced by junior workers at lower wage levels or such positions are offshored, and MNCs lay off more senior IT workers with greater firm-specific experience in the U.S., this would also reduce the marginal returns of firm-specific IT experience in the U.S.

[12] Media reports suggest that U.S. technology firms colluded to reduce wages and were fined for this collusion (Streitfeld, 2015). Such collusion would reduce returns on firm-specific IT experience due to reduced bargaining power of employees. Although MNCs could benefit from quality technical talent in any location, the difference in costs suggests that MNCs are more likely to hire affordable technical talent in emerging economies.

To the extent that MNCs engage in global disaggregation of their value chains and leverage offshoring to lower their costs, they are likely to offshore routine tasks to enable IT professionals in the U.S. to focus on strategic activities such as leadership and motivation, boundary-spanning and interactional responsibilities, negotiation and enforcement of contracts, development and management of budgets, team-building and delegation, coordinating and cultivating relationships with partners, and analyzing options and planning for contingencies (Davis-Blake and Broschak, 2009). Considering that IT managers at headquarters understand the firm's corporate strategy, organizational structure, and executive decision-making processes and biases (Slaughter, Ang and Boh, 2007), they can play an important role and can leverage their knowledge by working with and supervising a team of offshore service professionals (Antràs, Garicano and Rossi-Hansberg, 2006). When routine IT processes such as programming and testing are offshored, IT managers at headquarters generate business value through control, knowledge transfer, specification and design of IT initiatives, and coordination and collaboration with offshore service providers to complete the IT initiatives (Dibbern, Winkler and Heinzl, 2008). Headquarters managers with MBA education receive the greatest increase in compensation, because those managers are able to leverage their knowledge over an entire international team of personnel. Even though the factor costs of MBA education are lower in emerging economies, MNCs would retain managerial activities at headquarters because developed economies have the human capital and supporting resources to most productively apply the human capital. These findings provide new insights on mechanisms that influence compensation of technical and managerial professionals, based on contextual firm-level factors such as national origin and employee-level factors such as firm-specific IT experience and MBA education within and across geographies. They also contextualize Lazear's (2009) skill-weights approach and explain why foreign-origin and Indian-origin firms may value MBA education and firm-specific IT experience differently, because of differences in their strategies and their relative access to resources around the world.

5.2 Research implications

Our empirical findings document important stylized facts to understand the context of compensation for IT professionals, and suggest several research implications. First, the differences in compensation of IT professionals in India between developed economy MNCs and emerging economy firms suggest that these firms currently follow different HR strategies. While the HR strategies of developed economy MNCs and emerging economy firms differ during the timeframe in our data, these strategies may change or converge in the future as these firms increasingly compete in the same markets (Whitaker, Melville, Plice and Dedrick, 2010). While developed economy MNCs currently retain non-routine managerial responsibilities at headquarters in developed economies, developed economy MNCs may search for lower-cost managerial resources as higher education improves in emerging economies.

For example, IBM is the third largest private sector employer in India after TCS and Infosys (Economic Times 2015). While emerging economy firms currently retain managerial responsibilities in emerging economies because of their geographic footprint, emerging economy firms may expand their search for managerial resources as their geographic footprint expands in developed economies. For example, Infosys has offices in 15 U.S. states with about 4,000 American employees, and has indicated plans to hire additional American employees (John and Phadnis, 2017). It will be important to explore further similarities and differences in strategies between developed economy MNCs and emerging economy firms over time.

Second, the differences in relative compensation of IT professionals in India may also be partly driven by the prior and future alternatives available to developed economy MNCs and emerging economy firms. For example, developed economy MNCs formerly sourced most or all technical labor in the home country. Because IT enables MNCs to disaggregate some technical operations to emerging economies to reconfigure their value chain or to become more responsive in foreign markets (Mithas, Whitaker and Tafti, 2017), MNCs can source technical labor at a substantial cost savings by leveraging this arbitrage opportunity. In turn, MNCs can afford to pay a premium for firm-specific IT experience compared with emerging economy firms, and still save significant cost compared with the prior state. Although emerging economy firms have started to hire more workers in developed economies, they still rely more heavily on workers with MBAs in their home countries relative to MBAs in developed economies, which may explain why emerging economy firms pay a premium for MBA education in their home countries to obtain the best-available managerial labor. Similar to the discussion above, these available alternatives may also change over time. If India can achieve significant improvements in its management education system, then MNCs may gain the alternative to source more MBA education from India. If emerging economy firms can expand their field operations in developed economies, then emerging economy firms may gain the alternative to source more MBA education from developed economies. While our findings suggest that the marginal effect of firm-specific IT experience on compensation for IT professionals is greater in India and the marginal effect of MBA education is greater in the U.S., these states may change in the future as corporate strategies, organizational strategies, educational systems, and workplace technologies change.

Third, while this paper provides important insights about the context of compensation for IT professionals, the context associated with workers and organizations continues to advance at a rapid pace. For example, the onset of artificial intelligence and machine learning has tremendous implications for the technical skills that will be required to develop and maintain these advanced technologies, and for the managerial skills that will be required to interact with these advanced technologies (Brynjolfsson and Mitchell, 2017). These developments raise the question whether educational institutions in emerging

economies will be able to maintain their leadership role for the coming wave of artificial intelligence- and machine learning-based applications, similar to earlier initiatives in India to develop educational and training systems to produce a qualified workforce with skills in 'traditional' technologies such as client-server and Internet-based business applications. Similarly, when it comes to managerial education, some question whether conventional and generic MBA education is the best way to develop managerial skills, or whether it is time to shift toward specialized master's programs and online education to meet the needs of IT professionals and employers (Whitaker, New and Ireland, 2016).

Finally, ongoing developments including the rise of new technologies such as artificial intelligence and machine learning raise questions about shifts in the nature and future of work, and it remains an open question how these developments will affect knowledge work, managerial jobs in general, and IT professionals in particular. In 1960, Herbert Simon predicted the nature of managerial and IT professional occupations as they would exist 25 years later in 1985 "*…managers…will need, to work effectively, to understand their organizations as large and complex dynamic systems involving various sorts of man-machine and machine-machine interactions*" and he speculated that "*it is far more likely that the programming occupation will become extinct…*" Simon (1960, pp. 51-52).

Although Simon's predictions did not come to pass (Mithas, Kude and Whitaker, 2018) because the programming occupation is far from extinct and continues to enjoy significant occupational prestige, more recent advances in artificial intelligence and machine learning continue to attract questions whether such advances will enhance or diminish programming skills and the value of firm-specific experience and other workplace skills (Brynjolfsson, Rock and Syverson, 2017). On one hand, additional contextual knowledge required to properly configure those advanced technologies for the firm can enhance the value of firm-specific experience. On the other hand, if machine learning and artificial intelligence can successfully accumulate learning and make decisions that formerly required professionals with long tenure in the firm, such substitution can automate jobs and diminish the value of firm-specific experience (Ganesh, 2017). Although new technologies can destroy some jobs, they often create new jobs (such as data scientists), change the mix of jobs in the economy, and alter the nature of tasks within jobs. In particular, newer technologies can substitute humans by simplifying the whole job (robots replacing workers), substitute some tasks within a job that are amenable to rule-based logic (ATMs taking over some functions of a human teller), and/or complement humans in jobs that require pattern recognition or case-based reasoning (such as assisting medical diagnosis) (Levy and Murnane, 2004). While prior research suggests that occupations requiring expert thinking and complex communication have grown in the U.S. from 1960 – 2000 (Autor, Levy and Murnane, 2003), the generalizability of this pattern over time and in other economies such as India or China remain open empirical questions. There is need for research to understand whether newer technologies complement humans leading to intelligence

augmentation (IA) or substitute for humans as connoted by artificial intelligence (AI) (Jain, Padmanabhan, Pavlou and Santanam, 2018).

5.3 Managerial and Policy Implications

This study has implications for IT professionals, MNCs and policymakers. From the perspective of IT professionals, findings suggest that IT professionals working for MNCs may be better off staying in their current jobs and may gain little financially by acquiring MBA education within India. However, this recommendation does not apply for IT professionals working in India for Indian-origin firms, because these firms place a higher value on MBA education in India. Therefore, IT professionals working in India for Indian-origin firms may benefit financially by investing in MBA education in India. Note that these recommendations for IT professionals in India based on type of firm they work for differ from recommendations for IT professionals in the U.S. that earn high financial returns on an MBA degree (Mithas and Krishnan, 2008, Mithas and Krishnan, 2009).

From the perspective of MNCs, findings suggest that MNCs value education and skills differently across geographies to leverage unique opportunities and constraints across markets. MNCs need not follow uniform HR practices across the globe, and it is possible to follow a portfolio approach that maximizes innovation and profit potential while leveraging arbitrage opportunities across geographies. By making appropriate use of IT to modularize business processes, MNCs can move those processes around the world to perform each value chain activity (such as production of IT services) across subsidiaries and geographies where they are best accomplished leveraging locally-available talent (Mithas and Whitaker, 2007, Mithas, Whitaker and Tafti, 2017). MNCs can manage the portfolio of IT professionals to optimize profits by treating American and foreign IT workers as complements (instead of perfect substitutes) not only within a particular country but also across geographies (Lucas and Mithas, 2011, Mithas and Han, 2012).

An indirect policy implication of our findings in this study and related research is that visa and immigration policies that often treat American and Indian IT professionals as perfect substitutes may not be prudent and can constrain the optimal hiring decisions for MNCs. We acknowledge that direct evidence of the potential complementarity among American and foreign IT workers at the firm level can help to provide more definitive policy guidance even though firms are becoming increasingly reticent to disclose the geographic composition of their workforce (Han and Mithas, 2013, Lucas and Mithas, 2011, Mithas and Lucas, 2010, Yang, 2011).

5.4 Limitations and suggestions for further research

This study has at least two limitations that provide opportunities for further research. One limitation relates to lack of employer identity in the U.S. data. We compare compensation practices of firms in the U.S. with developed economy MNCs in India under the assumption that most large firms in

the U.S. are developed economy MNCs. While the *InformationWeek* data does not include the employer identity, we believe our assumption is reasonable because *InformationWeek* targets its surveys and readership to IT professionals of large firms in the U.S. that are more likely to have international operations. In a related point, the lack of employer identity in the U.S. data prevents us from controlling for firm-level effects that may impact compensation.

Second, we recognize that India has differences from other emerging economies and the U.S. has differences from other developed economies, which limits our ability to generalize our findings to other emerging and developed economies. One future research opportunity would be to study the impact of human capital on compensation for IT professionals in other emerging (such as China) and developed economies (such as Germany or the United Kingdom) using more fine-grained data on education and experience of IT professionals over time, beyond the single points in time as in this paper. Such research would enable us to better understand the value of firm-specific IT experience and MBA education, including whether the value of an MBA differs based on whether the professional earns the MBA right after the undergraduate degree or after earning work experience. We acknowledge that technical and managerial requirements can vary across positions and geographies. For example, chip design, technology product design, and data analytics are technical competencies, but are very different from technical competencies such as software testing, quality assurance, and application development. Although our paper focuses on firm-specific IT experience consistent with prior research (Slaughter, Ang and Boh, 2007), it would be useful to examine more granular dimensions of technical skills in future research. Similarly, the managerial competencies required for developed economy firms to accomplish their strategy of low cost products and services may be different from the managerial competencies required by developed economy MNCs to be responsive to local markets or coordinate and configure their value chain across geographies (Mithas, Whitaker and Tafti, 2017).

In addition to future research to address limitations of our data, we also identify two additional research opportunities. First, our study uses data from 2005 – 2007, and although this data has the advantage of allowing us to compare compensation practices within and across geographies for that period, the continuing evolution of the IT industry and Indian IT firms (Rajaraman, 2015) presents opportunities to test the generalizability of our findings using more recent data. As Rajaraman (2015) argues, from 1998 – 2010 the Indian IT industry could be characterized in the same phase of rapid growth that saw many Indian IT companies become world class. Since 2010, the world of IT has seen significant changes such as wider diffusion of new technologies including cloud computing, mobile computing, big data, business analytics, artificial intelligence, increased use of agile practices, consumerization of IT, and important changes in the organizational context such as blurring boundaries between IT and non-IT workers, changes in demand for types of skills in the workplace, and changes in the demographic mix of

IT departments that call for replicating our analyses for more recent periods to assess changes in the production function of IT services (Kappelman, Johnson, Maurer, McLean, Torres, Nguyen and Alsius, 2018, Wattal, Langer, Mithas, Boh and Slaughter, 2015). Although *InformationWeek* and our research site in India no longer conduct the types of detailed surveys that we utilized for this research, researchers should consider using primary surveys or other large archival datasets such as those produced by the U.S. Bureau of Labor Statistics.

Second, we note with interest that findings on the valuation of MBA education by the IT firms in this study differ from the valuation of MBA education by the business process outsourcing (BPO) firms in related research (Kim, Mithas, Whitaker and Roy, 2014). In this study, the coefficient of compensation for MBA education for IT professionals in India was positive and statistically-significant for developed economy MNCs, and even higher for emerging economy firms. However, Kim et al. (2014) did not find a statistically significant effect of MBA education on compensation for BPO professionals in India. While some IS research has bundled IT positions with IT-enabled service (ITES) positions, the different findings for MBA education suggest that the nature of IT positions may be significantly different from the nature of BPO positions, in the skills and education required and the manner in which employers value the skills and education. A closer look at the differences between IT and ITES/BPO positions would be a fruitful area for future research.

To conclude, this study investigates the marginal effect of firm-specific IT experience and MBA education on the compensation of IT professionals in India by developed economy MNCs and emerging economy firms, and on the compensation of IT professionals in the U.S. We find that the marginal effect of firm-specific IT experience on compensation for IT professionals in India is greater for developed economy MNCs than for emerging economy firms, and greater in India than in the U.S. We also find that the marginal effect of MBA education on compensation for IT professionals in India is greater for emerging economy firms than for developed economy MNCs, and greater in the U.S. than in India. Our findings suggest that developed economy MNCs retain non-routine managerial responsibilities in developed economies where managerial education and supporting resources exist. Developed economy MNCs complement MBA education from developed economies with firm-specific IT experience from emerging economies where that experience is available and supporting resources exist. Even as this study answers some questions about the context of compensation for IT professionals, exciting changes in technologies, educational systems, and the nature of work are changing the context and opening new opportunities to understand how technologies, strategies and policies influence the careers and compensation of IT and managerial professionals in the evolving global economy.

References

Ang S, Slaughter SA. (2000). *The missing context of Information Technology personnel: A review and future directions for research*. Pinnaflex Press, Cincinnati, Ohio.

Ang S, Slaughter SA, Ng KY. (2002). Human Capital and Institutional Determinants of Information Technology Compensation: Modeling Multilevel and Cross-Level Interactions. *Management Science* 48(11):1427-1445.

Antràs P, Garicano L, Rossi-Hansberg E. (2006). Offshoring in a Knowledge Economy. *Quarterly Journal of Economics* 121(1):31-77.

Apte UM, Mason RO. (1995). Global Disaggregation of Information-Intensive Services. *Management Science* 41(7):1250-1262.

Aron R, Clemons EK, Reddi S. (2005). Just Right Outsourcing: Understanding and Managing Risk. *Journal of Management Information Systems* 22(2):37-55.

Autor DH, Levy F, Murnane RJ. (2003). The Skill Content of Recent Technological Change: An Empirical Exploration. *Quarterly Journal of Economics* 118(4):1279-1333.

Bapna R, Barua A, Mani D, Mehra A. (2010). Cooperation, Coordination, and Governance in Multisourcing: An Agenda for Analytical and Empirical Research. *Information Systems Research* 21(4):785-795.

Bassellier G, Benbasat I. (2004). Business Competence of Information Technology Professionals: Conceptual Development and Influence on IT-Business Partnerships. *MIS Quarterly* 28(4):673-694.

Bhagwati J, Panagariya A, Srinivasan TN. (2004). The muddles over outsourcing. *Journal of Economic Perspectives* 18(4):93-114.

Bloom N, Genakos C, Sadun R, Van Reenen J. (2012). Management Practices Across Firms and Countries. *Academy of Management Perspectives* 26(1):12-33.

Bloom N, Sadun R, Van Reenen J. (2012). Americans Do IT Better: U.S. Multinationals and the Productivity Miralce. *American Economic Review* 102(1):167-201.

Bloom N, Van Reenen J. (2010). Why Do Management Practices Differ Across Firms and Countries? *Journal of Economic Perspectives* 24(1):203-224.

Brown C, Medoff M. (1989). The Employer Size-Wage Effect. *Journal of Political Economy* 97(5):1027-1059.

Bruche G. (2009). The Emergence of China and India as New Competitors in MNC's Innovation Networks. *Competition & Change* 13(3):267-288.

Brynjolfsson E, Mitchell T. (2017). What Can Machine Learning Do? Workforce Implications. *Science Magazine* 358(6370):1530-1534.

Brynjolfsson E, Rock D, Syverson C. (2017). Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics. *NBER Working Paper 24001*.

Byrd TA, Turner DE. (2001). An Exploratory Analysis of the Value of the Skills of IT Personnel: Their Relationship to IS Infrastructure and Competitive Advantage. *Decision Sciences* 32(1):21-54.

Cappelli P, Singh H, Singh JV, Useem M. (2010). Leadership Lessons from India. *Harvard Business Review* 88(3):90-97.

Carpenter MA, Sanders WG, Gregersen HB. (2001). Bundling Human Capital with Organizational Context: The Impact of International Assignment Experience on Multinational Firm Performance and CEO Pay. *Academy of Management Journal* 44(3):493-511.

Castanias RP, Helfat CE. (1991). Managerial Resources and Rents. *Journal of Management* 17(1):155-171.

Clemons EK, Aron R. (2004). *Maximze Your Outsourcing Benefits Through Complexity Arbitrage: or "Just Because I Said it Was Complicated Doesn't Mean that it's Hard!"*. University of Pennsylvania, Philadelphia.

Crino R. (2008). Offshoring, Multinationals and Labour Market: A Review of the Empirical Literature. *Journal of Economic Surveys* 23(2):197-249.

Davis-Blake A, Broschak JP. (2009). Outsourcing and the Changing Nature of Work. *Annual Review of Sociology* 35(1):321-340.

Dibbern J, Winkler J, Heinzl A. (2008). Explaining Variations in Client Extra Costs Between Software Projects Offshored to India. *MIS Quarterly* 32(2):333-366.

Dossani R, Kenney M. (2007). The Next Wave of Globalization: Relocating Service Provision to India. *World Development* 35(5):772-791.

Dreher GF, Cox TH. (1996). Race, Gender, and Opportunity: A Study of Compensation Attainment and the Establishment of Mentoring Relationships. *Journal of Applied Psychology* 81(3):297-308.

Du J, Choi JN. (2010). Pay for Performance in Emerging Markets: Insights from China. *Journal of International Business Studies* 41(4):671-689.

Economic. (2015). *India's Eight Biggest Employers*.
Farrell D, Laboissière MA, Rosenfeld J. (2006). Sizing the Emerging Global Labor Market: Rational Behavior from Both Companies and Countries Can Help It Work More Efficiently. *Academy of Management Perspectives* 20(4):23-34.
Ferratt TW, Agarwal R, Brown CV, Moore JE. (2005). IT Human Resource Management Configurations and IT Turnover: Theoretical Synthesis and Empirical Analysis. *Information Systems Research* 16(3):237-255.
Foerderer J, Kude T, Mithas S, Heinzl A. (2016). *How Deadline Orientation and Product Modularity Influence Software Quality and Job Satisfaction*. Academy of Management, Anaheim, CA.
Foerderer J, Kude T, Mithas S, Heinzl A. (2016). *How Software Developers' Temporal Work Style and Product Modularity Influence Software Quality and Job Satisfaction*. Association for Computing Machinery, Washington, DC.
Frank KA. (2000). Impact of a Confounding Variable on a Regression Coefficient. *Sociological Methods & Research* 29(2):147-194.
Freeman RB. (2006). People flows in globalization. *Journal of Economic Perspective* 20(2):145-170.
FT.com. (2018). *Global MBA Ranking 2018*. Financial Times.
Gallagher KP, Kaiser KM, Simon JC, Beath CM, Goles T. (2010). The Requisite Variety of Skills for IT Professionals. *Communications of the ACM* 53(6):144-148.
Ganesh V. (2017). *Automation to Kill 70% of IT Jobs*. The Hindu Business Line, November 14.
Gefen D, Carmel E. (2008). Is the World Really Flat? A Look at Offshoring at an Online Programming Marketplace. *MIS Quarterly* 32(2):367-384.
Gerhart B, Milkovich GT. (1990). Organizational Differences in Managerial Compensation and Financial Performance. *Academy of Management Journal* 33(4):663-691.
Ghemawat P. (2007). *Redefining Global Strategy: Crossing Borders in a World Where Differences Still Matter*. (Harvard Business School Press, Boston).
Han K, Mithas S. (2013). Information technology outsourcing and non-IT operating costs: An empirical investigation. *MIS Quarterly* 37(1):315-331.
Hansson P. (2005). Skill Upgrading and Production Transfer within Swedish Multinationals. *Scandinavian Journal of Economics* 107(4):673-692.
Heckman JJ, Lochner LJ, Todd PE. (2003). *Fifty Years of Mincer Earnings Regressions (NBER Working Paper 9732)*. New York.
Hennart J-F. (2012). Emerging Market Multinationals and the Theory of the Multinational Enterprise. *Global Strategy Journal* 2(3):168-187.
Hitt MA, Li H, Worthington WJI. (2005). Emerging Markets as Learning Laboratories: Learning Behaviors of Local Firms and Foreign Entrants in Different Institutional Contexts. *Management and Organizational Review* 1(3):353-380.
Huang P, Tafti A, Mithas S. (2018). Platform Sponsor's Investments and User Contributions in Knowledge Communities: The Role of Knowledge Seeding. *MIS Quarterly* 42(1):213-240.
Jain H, Padmanabhan B, Pavlou PA, Santanam RT. (2018). Special Issue of Information Systems Research-Humans, Algorithms, and Augmented Intelligence: The Future of Work, Organizations, and Society. *Information Systems Research* 29(1):250-251.
John S, Phadnis S. (2017). *Trump Effect: Infosys to Hire 10,000 in US Over Next 2 Years*. Times of India, May 3.
Joseph D, Ang S, Slaughter SA. (2008). *Relative Wage Differences and the Career Transitions of IT Professionals*. Anaheim, CA.
Joseph D, Boh WF, Ang S, Slaughter SA. (2012). The Career Paths Less (or More) Traveled: A Sequence Analysis of IT Career Histories, Mobility Patterns, and Career Success. *MIS Quarterly* 36(2):427-452.
Joseph D, Ng KY, Koh C, Ang S. (2007). Turnover of Information Technology Professionals: A Narrative Review, Meta-Analytic Structural Equation Modeling, and Model Development. *MIS Quarterly* 31(3):547-577.
Kappelman L, Johnson V, Maurer C, McLean E, Torres R, Nguyen Q, Alsius D. (2018). The 2017 SIM IT Issues and Trends Study. *MIS Quarterly Executive* 17(1):53-88.
Kim K, Mithas S, Whitaker J, Roy PK. (2014). Industry-Specific Human Capital and Wages: Evidence from the Business Process Outsourcing Industry. *Information Systems Research* 25(3):618-638.
Kotlarsky J, Scarbrough H, Oshri I. (2014). Coordinating Expertise Across Knowledge Boundaries in Offshore-Outsourcing Projects: The Role of Codification. *MIS Quarterly* 38(2):607-627.
Kraemer K, Dedrick J. (1998). Globalization and Increasing Returns: Implications for the U.S. Computer Industry. *Information Systems Research* 9(4):303-322.

Krueger AB. (1993). How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984-1989. *Quarterly Journal of Economics* 108(1):33-60.
Lau CM, Ngo HY. (1996). One Country Many Cultures: Organizational Cultures of Firms of Different Country Origins. *International Business Review* 5(5):469-486.
Lee DMS, Trauth EM, Farwell DW. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. *MIS Quarterly* 19(3):313-340.
Levina N, Xin M. (2007). Comparing IT Workers' Compensation Across Country Contexts: Demographic, Human Capital, and Institutional Factors. *Information Systems Research* 18(2):193-210.
Levy F, Murnane RJ. (2004). *The New Division of Labor: How Computers are Creating The Next Job Market*. (Russell Sage Foundation, New York).
Liu Y, Aron R. (2015). Organizational Control, Incentive Contracts, and Knowledge Transfer in Offshore Business Process Outsourcing, Information Systems Research. *Information Systems Research* 26(1):81-99.
Lucas HC, Mithas S. (2011). Foreign-Born IT Workers in the US: Complements, not Substitutes, https://ieeexplore.ieee.org/document/5960024. *IEEE IT Professional* 13(4):36-40.
Mani D, Srikanth K, Bharadwaj A. (2014). Efficacy of R&D Work In Offshore Captive Centers: An Empirical Study of Task Characteristics, Coordination Mechanisms And Performance. *Information Systems Research* 25(4):846-864.
Manning A. (2011). Imperfect Competition in the Labor Market. *Handbook of Labor Economics* 4:973-1041.
Manning S, Massini S, Lewin AY. (2008). A Dynamic Perspective on Next-Generation Offshoring: The Global Sourcing of Science and Engineering Talent. *Academy of Management Perspectives* 22(3):35-54.
Matloff N. (2003). On the Need for Reform of the H-1B Non-Immigrant Work Visa in Computer-Related Occupations. *University of Michigan Journal of Law Reform* 36(4):815-914.
Mayer KJ, Somaya D, Williamson IO. (2012). Firm-Specific, Industry-Specific, and Occupational Human Capital and the Sourcing of Knowledge Work. *Organization Science* 23(5):1311–1329.
McCarthy N. (2017). *The Countries With The Most STEM Graduates*. Forbes, February 2.
Mithas S, Han K. (2012). *How Do Foreign Workers Affect U.S. Workers and Firm Profits?* , Boston, MA.
Mithas S, Krishnan MS. (2008). Human Capital and Institutional Effects in the Compensation of Information Technology Professionals in the United States. *Management Science* 54(3):415-428.
Mithas S, Krishnan MS. (2009). From association to causation via a potential outcomes approach. *Information Systems Research* 20(2):295-313.
Mithas S, Kude T, Whitaker JW. (2018). Artificial Intelligence and IT Professionals, https://ieeexplore.ieee.org/document/8509563. *IEEE IT Professional* 20(5):6-13.
Mithas S, Lucas HC. (2010). Are Foreign IT Workers Cheaper? U.S. Visa Policies and Compensation of Information Technology Professionals. *Management Science* 56(5):745-765.
Mithas S, Whitaker J. (2007). Is the World Flat or Spiky? Information Intensity, Skills and Global Service Disaggregation. *Information Systems Research* 18(3):237-259.
Mithas S, Whitaker JW, Tafti AR. (2017). Information Technology, Revenues and Profits: Exploring the Role of Foreign and Domestic Operations. *Information Systems Research* 28(2):430-444.
Moncarz RJ, Wolf MG, Wright B. (2008). Service-Providing Occupations, Offshoring, and the Labor Market. *Monthly Labor Review* 131(12):71-86.
NASSCOM-McKinsey. (2005). *NASSCOM-McKinsey report 2005: Extending India's leadership of the global IT and BPO industries*. NASSCOM, New Delhi.
Ng TWH, Eby L, Sorensen KL, Feldman DC. (2005). Predictors of Objective and Subjective Career Success: A Meta-Analysis. *Personnel Psychology* 58(2):367-408.
Rajaraman V. (2015). History of Computing in India: 1955-2010. *IEEE Annals of the History of Computing* 37(1):24-35.
Ramamurti R. (2012). What is Really Different About Emerging Market Multinationals? *Global Strategy Journal* 2(1):41-47.
Rodrik D. (1997). *Has Globalization Gone Too Far?* (Institute for International Economics, Washington, D.C.).
Roy A, Marriott I. (2011). *Analysis of India as an Offshore Services Location*. Gartner, Stamford, CT.
Samuelson PA. (2004). Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization. *Journal of Economic Perspectives* 18(3):135-146.
Sanders WG, Carpenter MA. (1998). Internationalization and Firm Governance: The Roles of CEO Compensation, Top Team Composition, and Board Structure. *Academy of Management Journal* 41(2):158-178.
Schuler RS, Rogovsky N. (1998). Understanding Compensation Practice Variations Across Firms: The Impact of National Culture. *Journal of International Business Studies* 29(1):159-177.

Simon HA. (1960). *The corporation: Will it be managed by machines?* McGraw-Hill, New York.
Slaughter SA. (2014). *A Profile of the Software Industry: Emergence, Ascendance, Risks, and Rewards*. (Business Expert Press).
Slaughter SA, Ang S, Boh WF. (2007). Firm-Specific Human Capital and Compensation-Organizational Tenure Profiles: An Archival Analysis of Salary Data for IT Professionals. *Human Resource Management* 46(3):373-394.
Streitfeld D. (2015). Bigger Settlement Said to Be Reached in Silicon Valley Antitrust Case, available at http://www.nytimes.com/2015/01/15/technology/silicon-valley-antitrust-case-settlement-poaching-engineers.html. *New York Times* Jan 14, 2015.
Sturman MC, Walsh K, Cheramie RA. (2008). The Value of Human Capital Specificity Versus Transferability. *Journal of Management* 34(2):290-316.
Tafti A, Sachdev V, Mithas S, Mallik L. (2015). *Alliances, R&D and Profitability of Software Firms*. Association for Information Systems, Forth Worth, Texas.
Tambe P, Hitt LM. (2012). Now IT's Personal: Offshoring and the Shifting Skill Composition of the U.S. Information Technology Workforce. *Management Science* 58(4):678-695.
Tambe PB, Hitt LM. (2010). How offshoring affects IT workers. *Communications of the ACM* 53(10):62-70.
Tambe PB, Hitt LM. (2012). The Productivity of Information Technology Investments: New Evidence from IT Labor Data. *Information Systems Research* 23(3 Part 1):599-617.
Tambe PB, Hitt LM, Brynjolfsson E. (2012). The Extroverted Firm: How External Information Practices Affect Innovation and Productivity. *Management Science* 58(5):843-859.
Tanriverdi H, Konana P, Ge L. (2007). The Choice of Sourcing Mechanisms for Business Processes. *Information Systems Research* 18(3):280-299.
Wattal S, Langer N, Mithas S, Boh WF, Slaughter S. (2015). *Thriving with digital transformations: Redefining an agenda for research on IT human capital*
Whitaker J, Melville N, Plice R, Dedrick J. (2010). The Role of Economic Development and Firm Internationalization in Internet Business Practices. *Communications of the Association for Information Systems* 27(1):611-626.
Whitaker J, Mithas S, Krishnan MS. (2011). Organizational Learning and Capabilities for Onshore and Offshore Business Process Outsourcing. *Journal of Management Information Systems* 27(3):11-42.
Whitaker J, New JR, Ireland RD. (2016). MOOCs and the Online Delivery of Business Education: What's New? What's Not? What Now? *Academy of Management Learning and Education* 15(2):345-365.
Yang JL. (2011). *In companies' job numbers, a key figure is missing*. Washington Post (22 Aug 2011), A1, A8.

Table 1. Variables in India and U.S. data

Variable	Definition and operationalization
Ln(Compensation)	[India] Natural log of gross compensation in Rupees, including gross take home pay / allowances and not including stock options / other non-monetary benefits. Deflated 2006 compensation to 2005 Rupees using Reserve Bank of India (RBI) Consumer Price Index (CPI) for urban non-manual employees, and 2007 compensation to 2005 Rupees using RBI CPI annual variation based on an average of monthly data. Following prior research (Kim, Mithas, Whitaker and Roy, 2014), we use mid-point values from the original bracketed variable for compensation. [U.S.] Natural log of cash compensation (base pay plus bonus) for IT professionals in U.S. dollars. We converted the nominal dollar value of 2006 compensation to 2005 dollars by deflating salary figures using the Employment Cost Index for all workers computed by the U.S. Bureau of Labor Statistics.
MBA	Highest educational degree is Master of Business Administration (1=yes, 0=no).
Firm-specific IT experience	Years of IT experience at current firm.
General IT experience	Years of IT experience at previous firms.
Total experience	[India] Years of total work experience. [U.S.] Years of total work experience operationalized as age minus 6 minus years of education.
Firm size	[India] Bracketed variable for number of employees in the organization (1=fewer than 500, 2=501-5000, 3=5001-50000, 4=more than 50000). [U.S.] Bracketed variable for number of employees in the organization (1=fewer than 100, 2=101-1000, 3=1001-10000, 4=more than 10000).
Male	Gender (1=male, 0=female).
Age	[India] Bracketed variable for respondent age (1=less than 20, 2=21-25, 3=26-30, 4=31-35, 5=36-40, 6=41-45, 7=more than 45). [U.S.] Number of years of age.
MNC (India)	Firm of foreign origin or with headquarters outside India (1=yes, 0=no).
Bachelor of Engineering (India) *Bachelor's (U.S.)*	[India] Highest educational degree is Bachelor of Engineering (1=yes, 0=no). [U.S.] Highest educational degree is Bachelor's degree (1=yes, 0=no).
Master of Technology (India) *Master's (U.S.)*	[India] Highest educational degree is Master of Technology (1=yes, 0=no). [U.S.] Highest degree is Master's degree other than MBA (1=yes, 0=no).
Master of Computer Applications (India)	Highest educational degree is Master of Computer Applications (1=yes, 0=no).
Graduate other (India)	Highest educational degree is Graduate degree other than Technology, Computer Applications, or Business (1=yes, 0=no).
Post Graduate other (India)	Highest educational degree is Post Graduate degree other than Technology, Computer Applications, or Business (1=yes, 0=no).
Some college (U.S.)	Highest educational degree is Some college education (1=yes, 0=no).
Year	[India] Dummy variables for survey years 2006 and 2007. [U.S.] Dummy variable for survey year 2006.

Table 2. Descriptive statistics for IT Professionals in India and U.S.

	India (n=8,353)				U.S. (n=11,808)			
	mean	**std dev**	**min**	**max**	**mean**	**std dev**	**min**	**max**
Compensation *Rs 100,000 for India data;* *$1,000 for U.S. data*	5.54	4.93	0.90	62.55	74.88	45.48	15.96	988.02
MNC	0.35	0.48	0.00	1.00	–	–	–	–
Firm-specific IT experience	2.54	2.65	0.00	26.00	7.21	6.18	0.00	40.00
General IT experience	2.30	3.09	0.00	43.08	7.76	7.88	0.00	45.00
Total experience	5.43	4.52	0.00	39.00	20.26	9.13	0.00	51.00
MBA	0.06	0.25	0.00	1.00	0.07	0.25	0.00	1.00
Bachelor of Engineering	0.49	0.50	0.00	1.00	–	–	–	–
Bachelor's	–	–	–	–	0.46	0.50	0.00	1.00
Master of Technology	0.06	0.24	0.00	1.00	–	–	–	–
Master of Computer	0.15	0.36	0.00	1.00	–	–	–	–
Master's	–	–	–	–	0.17	0.38	0.00	1.00
Post Graduate other	0.09	0.29	0.00	1.00	–	–	–	–
Graduate other	0.07	0.26	0.00	1.00	–	–	–	–
Some college	–	–	–	–	0.13	0.34	0.00	1.00
Firm size as bracketed variable *(approx. employees)*	2.48 (15,714)	0.79 (16,952)	1.00 (250)	4.00 (50,000)	2.68 (7,556)	1.08 (8,387)	1.00 (50)	4.00 (20,000)
Male	0.78	0.42	0.00	1.00	0.84	0.36	0.00	1.00
Age *(approx. years)*	3.02 (28.10)	0.99 (4.90)	1.00 (20.00)	7.00 (45.00)	(42.14)	(9.08)	(20.00)	(73.00)

Table 3. How MNCs and emerging economy firms value firm-specific IT experience and MBA education across India and the U.S.

(Dependent variable is natural log of compensation)

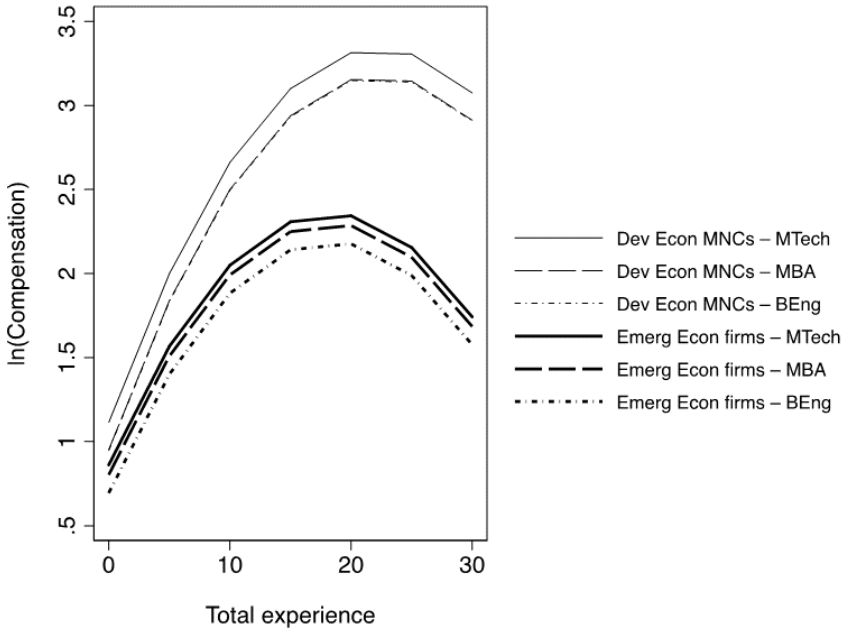
	(1) India	(2) India	(3) U.S.
	Emerging economy firms	**Developed economy MNCs**	**Developed economy MNCs**
Firm-specific IT experience	**0.090***** **(0.017)**	**0.133***** **(0.018)**	**0.025****** **(0.001)**
General IT experience	0.101*** (0.012)	0.102*** (0.012)	0.031** (0.002)
Total experience	0.072*** (0.009)	0.082*** (0.013)	0.024* (0.007)
MBA	**0.865***** **(0.066)**	**0.347***** **(0.092)**	**0.409****** **(0.039)**
Bachelor of Engineering	0.741*** (0.064)	0.453*** (0.083)	—
Bachelor's	—	—	0.223** (0.013)
Master of Technology	0.847*** (0.086)	0.608*** (0.098)	—
Master of Computer	0.712*** (0.059)	0.347*** (0.076)	—
Master's	—	—	0.329** (0.028)
Graduate other	0.391*** (0.060)	0.116 (0.099)	—
Post Graduate other	0.630*** (0.063)	0.301*** (0.091)	—
Some college	—	—	0.091** (0.010)
Observations	5,414	2,939	11,808
R-squared	0.526	0.638	0.291

*** $p<0.01$, ** $p<0.05$, * $p<0.10$

Columns (1) and (2) report robust standard errors in parentheses, clustered by firm and year; and models include a constant and control variables (not shown) for time period, employee age, gender, firm size, firm-specific IT experience squared, general IT experience squared, and total experience squared.

Column (3) reports robust standard errors in parentheses, clustered by year; and model includes control variables (not shown) for PhD, time period, employee age, gender, firm-specific IT experience squared, general IT experience squared, total experience squared, industry (IT intensity, dotcom), and firm size.

Figure 1. Compensation of education and experience by developed economy MNCs and emerging economy firms in India



Note: This figure illustrates the difference in compensation between developed economy MNCs and emerging economy firms for each education level in India. Results apply for an IT professional working for a firm of mean size in the sample. We include only male IT professionals who worked with only their current employer in this figure, and for these IT professionals total experience is the same as firm-specific IT experience.

Figure 2. Differences in value of firm-specific IT experience and MBA education by geography and firm national origin

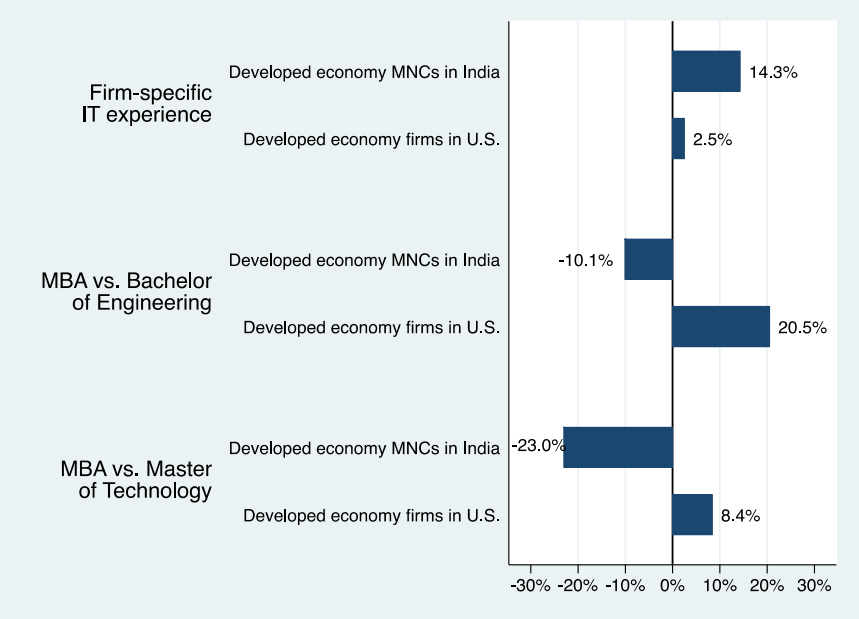


Figure 3. Differences in value of firm-specific IT experience and MBA education in India for product firms vs. service firms

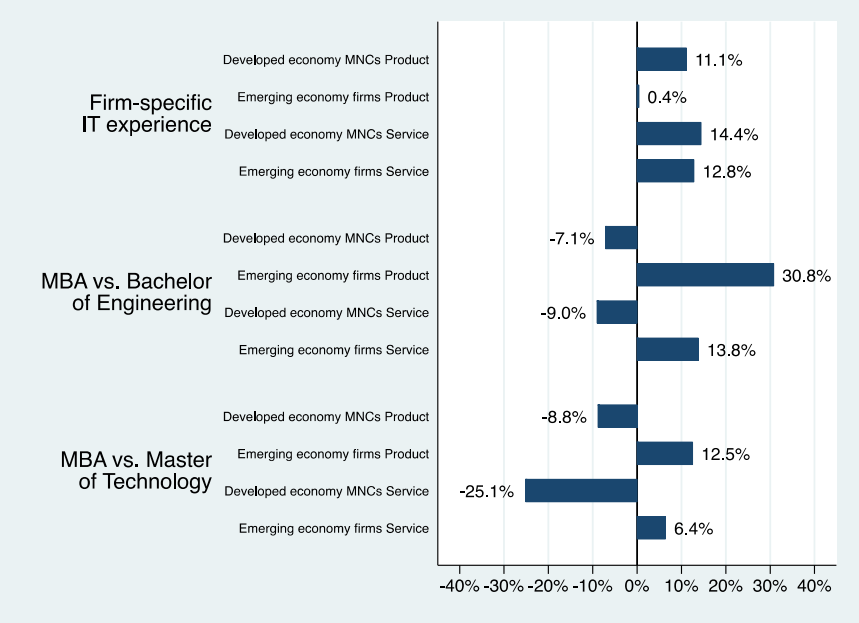


Figure 4. 2000-2015 employment and wage growth for IT positions in the U.S. with low vs. high global disaggregation potential