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Offshoring White-Collar Work: Editors' Summary

Offshoring of services burst into America's public consciousness in 2003, raising concerns about the nation's future competitiveness. For the first time, highly skilled white-collar workers in the United States perceived themselves to be in direct competition with lower-paid foreign workers. Viewed from across the Indian Ocean, services offshoring appeared to promise accelerated development—where poor countries could compete successfully with much richer ones by focusing their talent pool on a select group of high-value activities. For the first time in many decades, mainstream economists launched a serious debate over the possibility that trade could be zero sum (albeit only in special circumstances).

With the media stoking the popular imagination through dramatic, though often anecdotal or inconsistent “statistics,” the Brookings Institution embarked on an effort to analyze the offshoring phenomenon. First, seeking to separate fact from speculation, we convened a full-day conference in 2004 that focused narrowly on the available data, their implications, and their limitations. We then launched a broader research project aimed at illuminating offshoring from a variety of complementary views: those of theory and empirics, industries and labor markets, and developed and developing countries. Participants with diverse perspectives presented their analyses at the Brookings Trade Forum Conference in May 2005. This volume contains the fourteen revised papers, as well as invited commentary by fourteen additional experts and summaries of the conference discussions. Here we highlight some of the key themes and conclusions that emerged from the project, and then briefly summarize the papers.

The term *offshoring* has itself been the source of some confusion. In this volume, we distinguish between questions of location (whether an activity is undertaken in the home market or offshore) and questions of ownership (whether an activity is undertaken within an enterprise or is outsourced to an arm's-length

provider. Thus, by offshoring we mean the assignment of part or all of the value chain to an offshore (foreign) location, where an activity could be done either within the firm (in-house) or by a third party (at arm's length). In contrast, we use the term *outsourcing* to mean the assignment of services to a third party, whether domestic or foreign. The research focused on the new dimensions of offshoring, which reflect both sector and occupation: offshoring of services, as well as offshoring of white-collar work.

The contributors to this volume demonstrate that existing economic theory can go a long way toward capturing key dimensions of the services offshoring phenomenon. In particular, trade theory can explain why production processes that rely on skilled workers may migrate to locations in developing countries where such workers are relatively scarce; lack of complementary factors such as know-how may make them relatively inexpensive in these markets. In many respects, the issues raised by the new wave of offshoring parallel those that arose from the globalization of manufacturing that began some decades ago. But recent developments affect workers who tend to be more educated and to earn higher salaries. They often involve only a fragment of the value chain. And because of the nature of the relevant processes, recent theory suggests that levels of institutional development might constrain the extent to which developing countries can participate. Under quite sensible assumptions, standard trade models do not necessarily predict that high-wage economies such as the United States will gain from greater offshoring of services. One contribution of the project is to clarify the channels through which gains and losses might occur.

Since existing evidence consistently shows that relatively few service and white-collar jobs have been offshored to date, concerns focus on what might happen in the future. How much of the labor force in the United States and elsewhere is really vulnerable? As the 2004 workshop made clear, the answer is difficult to discern from existing data. Thus a contribution of this project is to present and discuss alternative approaches to constructing such indicators—one based on quantitative analysis across U.S. industries and occupations and the other based on a more subjective assessment for a large number of OECD countries. The results suggest that more of the industrial country workers exposed to international trade are employed in services than in manufacturing, and show that those workers suffer substantial losses when they are displaced. They also highlight that trade goes in both directions and that foreign firms locating domestically provide job opportunities for workers in tradable service sectors.

The spread of offshoring to services raises questions that are at least as important and consequential for developing countries as for the advanced ones. In this context, India emerges as a focus of both public and academic attention. Its econ-

omy is a study in contrasts—home to both a world-class information technology (IT) services sector and to one-quarter of the world’s poorest. Contributors to the project highlight both lessons and debates from recent research. There is broad agreement that India’s IT success is founded on a pool of highly educated English speakers and that IT services have thrived by working around poor infrastructure and taking advantage of episodic openings in the restrictive policy regime. Interestingly, among the potential constraints to future growth is a limited supply of suitably skilled workers, not concerns about India’s institutional weaknesses (such as corruption and patchy intellectual property enforcement). Significant disagreement emerged over the importance of India’s diaspora community to the IT success; whether the experience in IT will drive broader economic liberalization; and whether India could have reaped even greater dividends by pursuing a broader growth strategy premised on access to high-quality primary education, public investment in infrastructure, and sweeping policy reform.

Analysis of individual service sectors yields rich insights into the offshoring phenomenon. Software services have a long history of offshoring, particularly in India, followed by call centers, semiconductor design, and business process outsourcing (BPO). Radiology is an example of a relatively new focus of public attention. Services differ profoundly from manufacturing in that quality inheres in the underlying processes rather than in a final physical output. As a result, the decision to offshore depends on a firm’s ability to specify and monitor processes and on its choice of internal or arm’s-length organizational forms. In some sectors—notably call centers—a cookbook approach to offshoring appears to prevent foreign providers from fully utilizing their skilled workers or achieving maximum efficiency. Unexploited opportunities for arbitrage also are present in the BPO sector, where field surveys suggest the striking finding that advanced economy buyers and developing economy suppliers perceive complexity very differently. For instance, while processes requiring intensive algorithmic computation tend to be rated as complex by managers in the United States and the United Kingdom, managers in India and Singapore give high complexity ratings to processes requiring judgment-driven communication. Concerns about the loss of high-value services appear to be overblown in software services, call centers, and semiconductor design: the vertical decomposition of these services preserves the highest-value activities in the home market, while shedding lower-value processes to overseas providers. And professional credential requirements interact with other factors to make extensive offshoring of radiology services unlikely to come to pass.

What is the policy agenda that emerges from the spread of offshoring into services? The papers in this volume focus on two areas: social insurance and corporate taxation. The United States lags behind other wealthy economies on

social insurance. With offshoring and technological change accelerating the rate at which workers' job specific-skills depreciate, there is a strong case to be made for wage loss insurance, which would encourage workers to broaden their employment search and go back to work more quickly, while defraying the cost to employers of hiring and providing on-the-job training to new employees from different sectors. The policy agenda should also address economy-wide cost disadvantages. In this context, a case can also be made for simplifying the U.S. system of taxing multinationals' worldwide income and for lowering the corporate tax rate while broadening the base.

Part I: What Do We Learn from Trade Theory?

In the first paper of the volume, James Markusen examines offshoring of white-collar work from the perspective of a trade theorist. His approach is to construct a set of alternative conceptual frameworks, instead of focusing on a single detailed model based on one particular framework. The paper provides new and useful benchmarks for understanding the effects of offshoring on welfare and factor incomes among industrialized economies (which he calls the North) and emerging economies (the South).

Markusen begins by identifying the real-world features of offshoring that he believes models should consider. First, he argues that offshoring of white-collar services is largely about technical and institutional innovations that allow new things to be traded, and not about marginal liberalizations that allow more and less costly trade in existing traded goods and services. Further, the newly traded services tend not to be final goods, but instead parts of a production chain that is decomposed or "vertically fragmented" geographically. These offshored services can be either upstream (such as software design) or downstream (such as call centers that offer after-sales services). And the offshored service activities in his model can be fragmented from the production of a final manufactured good as easily as from the production of a final service.

Second, borrowing from mainstream trade theory, Markusen argues that it is important to incorporate differences in both technology across productive activities and factor supplies across countries. Fragments of the production process often differ in their factor intensities (that is, their relative use of unskilled labor, skilled labor, physical capital), while economies often differ in their factor endowments (the relative abundance of skilled and unskilled labor and physical capital). This may suggest, for example, that if production of a certain service

requires mid-level skills, its production may be best suited to locations where such labor is cheap.

However, the simplest off-the-shelf trade model in which factor intensities interact with factor endowments (the two-factor Heckscher-Ohlin model) implies that factors are always expensive where they are scarce. This is in stark contrast to the empirical fact that skilled labor is relatively cheap in some countries where it is also relatively scarce, such as India or China. Thus Markusen suggests expanding the basic model to incorporate an additional factor, which he labels “know-how.” The know-how could be physical capital, such as computers, networks, and satellite links, or knowledge capital, such as managerial, organizational, or marketing expertise. He makes the key assumption that know-how is complementary to skilled labor, thereby creating a potential missing input for countries otherwise well suited to the production of skill-intensive fragments. This feature provides an explanation for the “puzzle” that scarce factors can be relatively cheap.

Markusen presents a series of five simple models. The first is a standard two-good, two-factor, two-region Heckscher-Ohlin model with perfect competition. His innovation is to permit fragmentation of the initially more skill-intensive good, leading to a shift of the service activity from North to South—the offshoring of services. The second model incorporates “know-how,” the third factor assumed to be located primarily in the North and a necessary complement to the skilled labor used in services. Markusen’s third model omits know-how but introduces multinational firms that produce with increasing returns to scale under conditions of imperfect competition. The fourth model combines the missing input model with the multinational production structure.

Markusen also briefly discusses a fifth, somewhat more speculative, framework that considers some issues related to outsourcing—or whether offshoring is conducted within or outside the ownership boundaries of the multinational firm.

Markusen’s preferred framework is the missing input model, particularly with its extension to multinationals. His models illustrate how the ability to offshore white-collar services can exploit this gap between skills and know-how, bringing modern corporate knowledge to these skilled workers. Although there is clearly a benefit to the world economy overall, the model also highlights that there are winners and losers, and in particular, that some northern groups may be vulnerable. The implications of offshoring that these models suggest to be unambiguous are welfare gains for the South overall and welfare gains for skilled labor in the South. The implications for unskilled labor in both regions, for skilled labor in the North, and for overall welfare in the North are all mixed.

The second paper, by Daniel Trefler, elaborates on some of the issues Markusen considers in his fifth model. A central point of his analysis is that institutional development in potential host economies is likely to constrain the extent to which activities can be offshored, which he defines as the use of workers located abroad to provide sophisticated services to U.S. customers.

Trefler sees two key features of offshoring that distinguish it from other types of international trade. He identifies each feature with a set of concerns from the North. First, service offshoring uses some of the most dynamic information and communication technologies (ICT). It thus has implications for the corporate innovation strategies that lie at the heart of U.S. competitiveness policies. He argues that this feature raises the concern that U.S. firms may be crowded out of the most innovative lines of business, and that there is already some evidence of this among Indian multinationals such as Satyam, HCL, and Tata.

Second, Trefler notes that the employment of highly skilled white-collar workers in low-cost countries such as India raises the concern that offshoring may displace “good” U.S. jobs and depress salaries of high-paid workers, both of which would reduce the incentives of Americans to invest in their own human capital. A related concern is that the disruption from increased service offshoring may make it less worthwhile for firms to make long-term investments in their best workers. Although existing evidence suggests that service offshoring is currently small, Trefler stresses that many worry that, over the next ten to twenty years or more, imports from China and India will devastate the United States. He believes this concern is misplaced for two reasons. First, it ignores the law of comparative advantage, which states that no country can export all goods. He notes that similar concerns were expressed about Japan, where wages in 1959 were 10 percent of U.S. levels. However, the law of comparative advantage does not rule out the possibility that China and India will export high-tech goods and services, leaving the relatively low-skilled activities for Americans.

This raises Trefler’s third and perhaps central theme: the crucial role of institutions. Current thinking about innovation-based long-term growth focuses on (1) institutions that protect property rights from preying politicians and bureaucrats, (2) institutions that provide a fully functioning legal framework for arm’s-length transactions, and (3) institutions that balance the needs of innovators inside the corporation against the needs of investors outside the corporation. Trefler observes that these institutions are only beginning to take shape in China, India, and many of the other emerging markets that are potential offshoring hosts, and argues that they are unlikely to evolve quickly, even over a quarter-century horizon. Thus, Trefler concludes that China and India are a long way from being the world’s innovation giants.

Finally, Trefler believes that most of the sensible policies aimed at fostering American competitiveness in the service offshoring market are investment-promoting framework policies. These encourage American workers, firms, and governments to invest in building productive assets such as human capital and new technologies. While acknowledging that such framework policies address a whole host of domestic competitiveness issues and are not unique to offshoring, Trefler argues that they should still be seen as appropriate ways to address concerns raised by services offshoring. He advocates providing more assistance to workers who are displaced, both skilled white-collar workers and unskilled workers displaced by low-end manufacturing imports. Many of these issues are addressed in the paper on wage insurance by Lael Brainard, Robert Litan, and Nicholas Warren.

Part II: Exploring the Empirics

The next three papers in the volume address empirical issues. Traditionally, economists have treated services as nontraded activities. However, as globalized production expands beyond manufacturing to include a variety of services, this perspective is obsolescent, and the need for better measures of tradability is clear. Existing data on international flows of services provide at best an incomplete picture of the magnitude and dimensions of this growing phenomenon.

J. Bradford Jensen and Lori Kletzer present a new method for identifying which service activities are vulnerable to international trade. Their approach distinguishes occupations as well as industries and enables them to examine the implications of globalizing the production of services for domestic employment and job loss.

Specifically, Jensen and Kletzer use the geographic concentration of service activities in the United States to identify which service activities are traded domestically. They then classify activities that are traded domestically as potentially tradable internationally. Using the identified industries and occupations, they develop estimates of the number of workers who are in tradable activities in all sectors of the economy. This enables them to compare the demographic characteristics of workers in tradable and nontradable activities and the employment growth in traded and nontraded service activities.

Their approach to measuring tradability of services relies on the economic intuition that production of services will be geographically concentrated only if the services are traded. This builds from the observation that production of traded manufactured goods tends to be geographically concentrated (to capitalize on

increasing returns to scale, access to inputs like natural resources, etc.), while production of those that are not traded tends to be more widely distributed. Indeed, they show that the geographic concentration of some service activities within the United States is nearly as great as in manufacturing.

Their paper highlights three main findings. First, they conclude that the number of workers potentially exposed to international trade in services is actually larger than the number of exposed workers in manufacturing.

Second, workers in tradable sectors have higher skills and significantly higher earnings. The higher earnings do not appear to be solely a result of higher skill levels—in regressions controlling for observable characteristics, workers in selected tradable service activities have 16–17 percent higher earnings than similar workers in nontradable activities in the same sector.

Third, employment in tradable activities grew more slowly in the period 1998 to 2002, but Jensen and Kletzer show that this was due primarily to employment losses in manufacturing. Within services, employment in tradable and nontradable activities grew at similar rates except at the lowest end of the skill distribution. Average employment growth was negative in low-skill tradable industries and occupations but positive (though low) in nontraded low-skill services.

Jensen and Kletzer use the 2004 Displaced Worker Survey to examine the scope and cost of involuntary job loss. Briefly, they find some evidence that displacement rates are higher from tradable than from nontradable service industries. The difference is most notable in the Information sector; however, the authors note that this could simply represent displacements associated with the tech/telecom bubble and may not reflect offshoring. They also find somewhat higher displacement rates from tradable than from nontradable white-collar occupations. The same gap is not evident for blue-collar workers. Consistent with the employment characteristics, they find that workers displaced from tradable service activities are more educated, and have higher earnings, than workers displaced from nontradable activities. They are also more likely to be re-employed. Finally, they document that job loss from tradable and nontradable service activities is costly to workers (they typically endure a period of unemployment and are unlikely to earn as much in new jobs as they did in their former jobs).

Generalizing from what is known about manufacturing worker job loss, the authors speculate that lower levels of job tenure and higher levels of educational attainment may be advantages in seeking reemployment. They would favor a less porous safety net, provided, for example, by extending Trade Adjustment Assistance (TAA) to services workers and extending wage insurance beyond TAA.

The next two papers, by Maria Borga and by Desirée van Welsum and Xavier Reif, address evidence of existing and potential offshoring by U.S. and selected OECD multinational companies.

Borga uses firm-level data from the Bureau of Economic Analysis (BEA) to examine the evidence on the extent of offshoring by U.S. parent companies to their foreign affiliates, and then to determine if, and how, offshoring is associated with changes in U.S. parent employment. Using survey data from 1,117 U.S. parent companies, she studied their offshoring behavior by examining the shares of imports of goods from affiliated and unaffiliated parties and of imports of services from affiliated parties in their total purchased inputs.

Between 1994 and 2002, average employment growth was 39 percent for U.S. parent companies, a result of both mergers and acquisitions and the expansion of existing operations. Examining parents' offshoring behavior, she finds distinctions between goods and services as purchased inputs, as well as between purchases from affiliates versus nonaffiliates. Overall, she concludes that the vast majority of U.S. parents' purchased inputs are acquired from domestic sources, not imports in both 1994 and 2002.

The average share of foreign affiliates' sales to the local market increased, reaching 78 percent in 2002, while shares of sales to both third countries and the United States declined. The high share of sales to local markets demonstrates the importance of serving local customers in the parent's decision to invest abroad. This suggests that serving local markets was an increasingly important motive for U.S. MNCs' overseas expansion.

Borga also compares the data for parent companies with employment gains and those with employment losses. The average increase in employment (82 percent) is roughly the same as the average increase in sales (84 percent) for parents with employment gains. But for parents that lost employment, the average decrease in employment was 30 percent, well above the 10 percent average decrease in sales. Both sets of parents increased their reliance on purchased inputs. However, those parents whose employment declined strengthened their ties to their affiliates by increasing their reliance on imported goods and, to a lesser extent, on imported services from them. On the other hand, parents that gained employees had a smaller increase in reliance on affiliated imports of goods and reduced their reliance on affiliated imports of services.

The paper then turns to a decomposition of changes in parent employment among three factors: the change in output, the change in labor productivity, and the change in the use of purchased inputs in production. This decomposition shows that the increase in labor productivity was the most important factor for those parents that lost employment, followed by the loss of output and by the

increased use of purchased inputs. For those parents that gained employment, increased output more than accounted for the change in employment. Because most of the inputs purchased by parents are supplied by domestic firms, rather than imported, the loss of jobs due to greater imports accounted for less than one-third of the total change in employment attributed to the greater use of purchased inputs.

In the final section of the paper, Borga considers a variety of correlations, including those between employment and output, employment and labor productivity, employment and reliance on purchased inputs, and imports by parents and parents' employment.

In their paper, Desirée van Welsum and Xavier Reif also focus on the growing tradability of services and the implications for white-collar jobs previously shielded from international competition. Like Jensen and Kletzer, their work is motivated by the absence of any official data measuring the extent of the offshoring of services activities. Instead of a statistical approach, they consider a checklist of attributes and use their own judgment to identify tradable occupations.

The authors use data on trade in services and occupational employment to estimate the current extent of globalization of services in OECD economies and its potential growth. They find that in many countries often mentioned in the offshoring debate both exports and imports of business and computer and information services have grown rapidly. OECD countries still account for over 75 percent of exports of these services, but their share is declining.

Drawing on their earlier detailed analysis of occupational data for selected OECD countries, Van Welsum and Reif seek to determine the share of total employment that could potentially be affected by the international sourcing of IT- and ICT-enabled services. Their measure suggests that close to 20 percent of total employment could potentially be affected by offshoring, particularly in business services (for example, accounting, consulting), financial services, and research and development.

The authors provide a simple descriptive regression analysis of the relationship between the share of employment potentially affected by offshoring and other economic and structural developments for OECD economies between 1996 and 2003. They do not find any systematic or significant evidence that either net outward investment or imports of business services are associated with declines in the share of employment potentially affected by offshoring—at least at the aggregate level. However, they do find that exports of business services are positively associated with the share of employment potentially affected by offshoring, suggesting that increases in demand and production have also raised demand for these types of ICT-using occupations. Other key factors found to be

positively associated with the share of employment potentially affected by offshoring are the comparative size of the service sector, the growing share of ICT investment in total fixed investment, and human capital.

Part III: Offshoring—India's Role

The next two papers, by T. N. Srinivasan and Rafiq Dossani, consider the economic implications of services offshoring for India. T. N. Srinivasan finds the contribution of information technology services to Indian growth to be significant. He traces the spectacular development of India's IT sector to several sources, especially public investment in higher education and the creation of elite engineering schools. The policy regime was also influential: first as a restrictive force until the mid-1980s, subsequently as an enabling factor before the reforms of 1991, and thereafter as a proactive supportive force. Telecommunications reforms, government incentives for software technology parks (STPs), foreign investment, and venture capital all played prominent roles.

Srinivasan argues that the Indian IT diaspora concentrated in Silicon Valley was a significant factor in the rise of India's IT sector, although Rafiq Dossani finds evidence for the opposite view. Srinivasan notes that a significant number of Indian engineers who held senior positions in U.S. companies in the late 1990s subsequently helped persuade their senior management to establish operations in India. Moreover, the diaspora's influence is spreading beyond the narrow confines of the Indian IT industry to the broader contours of India's economic development and growth.

Srinivasan includes a brief analytical discussion of the influence of IT in the growth process and as a source of dynamic comparative advantage. IT services are in effect universal intermediates, which are essential to any production activity and possibly most, if not all, consumption activities. Any technical progress in the IT sector is reflected first in productivity gains (or cost reductions) in the IT sector. Other sectors begin to experience productivity gains as they invest in equipment and processes to take advantage of the new lower-cost information technology, which diffuses the total factor productivity (TFP) gains gradually over time.

Srinivasan next examines the prospects for and constraints on India's fulfilling the high expectations for IT-led growth. The spectacular growth of software exports and information-technology-enabled services and business process outsourcing (ITES-BPO) has been underpinned by the relative abundance of relatively low-wage English-speaking skilled workers. Srinivasan notes that current

trends could lead to excess demand for ITES/IT workers, which would put upward pressure on compensation. If the share of Indian graduates employed in the industry does not decline, the implied annual growth rate of 11.3 percent is far below the 35 percent growth in the value of India's ITES/IT output projected by India's National Association of Software and Service Companies (NASSCOM) for 2003–12.

Any increase in the compensation of ITES/IT workers in India with no change in their productivity would cut into India's cost competitiveness. While India is likely to remain competitive for the foreseeable future at the low end of the skill spectrum, India's competitive edge is likely to erode at the higher end of the spectrum, as Indian wages rise relative to U.S. wages. Already, worker turnover is high, particularly in smaller lower-value-added firms, which should put upward pressure on compensation. Potential future competitors include Bangladesh, Ireland, Pakistan, Sri Lanka, and the Philippines, all of which have pools of English-speaking workers suitable for ITES/IT employment, although only Bangladesh currently has wages below India's. Competition from China also cannot be ruled out, since English-speaking ability can be acquired.

Srinivasan believes the IT sector can make a significant contribution to India's future growth, but cautions that accelerating the rate of GDP growth to 8 percent or more per year and sustaining it for several decades is a necessary though not sufficient condition for achieving the overarching objective of eradicating poverty. He also believes that the success of the IT sector can help to broaden and strengthen political support for reforms in other sectors—if three things happen. First, politicians must recognize the link between reforms and the success of the IT sector. Second, a much greater proportion of the population must experience the benefits from efficient and inexpensive IT services. Third, political differences over the pace and sequencing of further reforms will have to be resolved.

In the next paper, Rafiq Dossani examines India's experience with providing offshored services to developed nations, where certain components of services exporting have been well established for decades. India has catapulted itself in recent years into a leadership position among developing economies on services exports related to information technology. Dossani's analysis offers central insights into how the services component of international trade has expanded and how a developing country like India could succeed in exporting services to developed countries.

Dossani begins with a discussion of how technology has helped to overcome the intrinsically greater obstacles to trade in services relative to manufactured goods. First, digitization allowed the conversion of service flows into stocks of

information, making it feasible to separate and store a service. The expanded ability to subdivide tasks reduced costs by offering the possibility of preparing the standardized components with lower-cost labor and, possibly, at another location. Second, digitization permitted noninformation service flows to be converted into information service flows—for instance, replacing the need for in-person sampling in a showroom with virtual sampling of goods delivered over the Internet. Third, costs associated with transmitting digitized material dropped significantly. Services such as writing software programs, which were offshored to India in the early 1970s, were enabled by digitized storage and, in the 1980s, by the standardization of programming languages. Still later, as digital transmission costs fell in the 1990s, even nonstorable services, such as customer care, could be offshored. Advances in information technology made the recent growth in offshoring possible by parsing the provision of certain services into components requiring different levels of skill and interactivity.

Dossani finds that the initial impact in India of services offshoring was to generate high and growing levels of employment. However, the low-value-added and low-skill work that was being produced also provided few barriers to entry and was subject to automation. The resulting competition and price deflation mimicked the situation in manufacturing exports in developing countries and raised the likelihood that asymmetries of globalization could be repeated in services exports from developing countries.

Dossani presents a multifaceted explanation of India's success with offshoring services. Local entrepreneurship and a high level of infant industry protection allowed the Indian IT industry to reach a high growth path and allowed local skills to keep pace with global changes. A key advantage appears to be widespread education in the English language. Other institutional advantages are India's mature judicial system, its conformance with WTO obligations, and a history of successful private enterprise that provided the talent for initiating and managing complex service projects. In contrast, China has better infrastructure but lacks a history of private entrepreneurship, a large population with knowledge of English, and a mature judicial system.

Dossani disagrees with the widely held view that spending by the government on education was a key contributor to the success of offshoring, and also argues that the global Indian diaspora has been largely noninfluential, except during the past few years.

He highlights the tendency for higher-stage work to remain in the developed countries. This is due to the lack of domain skills in India—a consequence of protectionist policies and the fact that India has no domestic demand for high-end services to promote the development of such skilled workforces. Dossani

does say that recent reforms intended to attract transnational corporations and transnationally trained diaspora could change the environment by introducing domain skills. Additional obstacles are technology, the need to protect proprietary knowledge, economies of scale and time, and mission criticality. Even when offshoring is possible, the in-house multinational is a favored organizational form in most cases. This enables much of the rents from sophisticated work to be captured in the developed country even though the work may be done in India.

Part IV: Lessons from Industry Studies

The next five papers provide a fascinating set of industry-level studies of offshoring in diverse service sectors. Clair Brown and Greg Linden examine semiconductor design, which is a frequently cited component of the new wave of services offshoring. Semiconductor (or chip) companies were among the first to invest in offshore facilities to manufacture goods for imports back to the United States.

Because meaningful data about the impact of the offshoring of chip design (and even of manufacturing) are limited, Brown and Linden rely on a more qualitative analysis for their key points. They conducted dozens of interviews with engineers and managers at numerous semiconductor and related companies in the United States, Asia, and Europe over the past twelve years. Their research also incorporates the rich store of publicly available information in trade journals and company reports. After briefly describing the stages of semiconductor production and their analytical framework, they examine the offshoring of assembly jobs, manufacturing, and design jobs. They also discuss what their conclusions mean for the United States.

Before addressing semiconductor design directly, Brown and Linden analyze the impact on the U.S. semiconductor industry of the offshoring of semiconductor assembly and fabrication. They argue that the initial concern about losing domestic jobs in both stages turned out to be unfounded, as the industry used the situation to its competitive advantage by becoming cost competitive (through assembly offshoring) and by developing the “fables” (design-only) sector (through foreign outsourcing of chip fabrication or manufacturing). Brown and Linden then analyze the ongoing offshoring of design jobs and compare this stage with the two stages that preceded it in order to explore the possible impact on domestic jobs and the U.S. semiconductor industry.

In the second industry study, Rosemary Batt, Virginia Doellgast, and Hyunji Kwon assess call centers through surveys of Indian and U.S. companies. To date, the depiction of this emerging sector has been based largely on anecdotal evidence rather than systematic empirical investigation of business practices—either in the United States or in India. Batt and her coauthors seek to map the extent of variation in service management and employment strategies among U.S. in-house, U.S. outsourced, and foreign offshore call centers that provide similar services to American customers. In addition, they test the impact of ownership status and firm strategies on worker turnover.

The authors begin with a literature review, which shows that service management strategies and employment systems vary substantially—from professional approaches to service to highly transactional or cost-driven ones. In addition, work and employment systems typically are differentiated according to the level of education and training required; the level of discretion and collaborative problem-solving embedded in the design of work; and the level and type of compensation system designed to motivate effort.

There are several straightforward implications from this literature on work design and employment systems. Companies are more likely to retain in-house those services that are more complex, involve customer transactions that are more nuanced or uncertain, and involve highly valued customers. In order to meet the demands of these types of products and customers, they are likely to focus on service quality and customization and to adopt a more professional approach to service than a subcontractor would. Centers operated by subcontractors, both in the United States and offshore, by contrast, are more likely to compete on costs by offering lower wages and benefits, using more standardized work processes, and closely monitoring performance.

From the literature review, Batt, Doellgast, and Kwon develop several testable predictions differentiating U.S. in-house, U.S. outsourced, and foreign offshore establishments. In their sample of establishments, in-house centers tend to adopt a more coherent quasi-professional approach to service interactions than outsourced and offshore sites; in-house jobs are characterized by relatively higher levels of initial investments in training and pay, discretion, and problem-solving opportunities. In offshore centers, by contrast, workers have somewhat higher levels of formal education and receive more initial training than in-house centers but have fewer opportunities to make choices or solve problems. Further multivariate analyses show that U.S. outsourced and offshore centers have significantly higher quit rates. Ownership status is an important driver in the choice of management and employment practices, with U.S. outsourced and offshore

centers more constrained to follow standardized operating procedures and performance monitoring.

At the level of managerial policy, the authors conclude that the extensive use of routinized work processes in call centers leads to high turnover, which limits options for customization and is associated with lower service quality and productivity. Moreover, to the extent that call centers hire college-educated workers, the highly constrained and monitored work system creates an inefficient use of human capital. The underutilization of human capital represents a substantial loss for Indian subcontractors, who are paying for skills that they are not using.

To the extent that companies have complex service offerings or want to compete on the basis of service differentiation, quality, or customer loyalty, they are likely to retain customer interactions in-house, consistent with the transaction costs perspective and core competency argument. To date, this appears to be what most U.S. corporations are doing: after two decades of rapid growth of U.S. call centers, most industry estimates are consistent with the authors' finding that less than 15 percent of U.S. call centers are run by third-party subcontractors; and only a tiny fraction have moved offshore.

However, for those transactions that are simple and codifiable, Batt and her coauthors predict that companies are likely to continue expanding their operations offshore. Their data suggest that the strategy of outsourcing operations to U.S. subcontractors is likely to be a transitory one, as the modest reductions in labor costs may be offset by the high costs of turnover and low levels of employee skill. According to this scenario, the U.S. subcontracting sector, which grew dramatically in the 1990s, will be the hardest hit by Indian competition. The scenarios also depend on human resource development. In India, there is evidence that demand is outstripping the short-run supply of skilled labor in call center cities such as Bangalore and Chennai. Thus, there is a need for the Indian government to invest in the human resource infrastructure.

The next industry study, by Ravi Aron and Ying Liu, investigates the offshore outsourcing of business processes in financial services. Aron and Liu's findings are based on four years of field research and data collection from firms that provide offshore outsourcing services in India, Mauritius, Singapore, and Thailand, and from clients that buy these services in the United States and the United Kingdom.

Operational risk is central to considerations of offshoring. Although the business media often claim that process complexity—the converse of codifiability—is the primary reason for operational risk, Aron and Liu's field research finds that process complexity actually means different things to different managers. Managers in the West perceive complexity very differently from man-

agers in the countries that provide offshoring services (India and Singapore). Managers in the United States and the United Kingdom tend to rate as complex those processes that call for analytical skills, algorithmic computational intensity, and many subtasks involving quantitative analysis. In contrast, managers in India and Singapore rate as highly complex processes where the work is not easily codifiable and requires judgment-driven communication and context-sensitive inference, and as less complex those that require quantitative analysis and algorithmic computational work.

This astonishing finding leads Aron and Liu to ask if there might be a market for complexity arbitrage. Could offshoring release not just gains from wage arbitrage but also from classic specialization in relative comparative advantage?

How much a firm gains from offshore outsourcing depends on how well it is able to manage operational risk. To measure this, Aron and Liu analyze the factors that contribute to operational risk (from survey data). They use a “knowledge continuum” to describe the nature of different stages of information work and how that determines operational risk. They then regress the magnitude of observed operational errors against several of these attributes of the process, the outsourcing contract, and the workforce.

Two factors have the greatest influence on operational risk. First, as the work involved in executing offshore processes becomes more *codifiable*, operational risk declines. Processes that are not easily codifiable or for which the agents need deep context-sensitive understanding of how the process is to be executed are more prone to operational errors. Second, when the buyer and provider of services can agree on a precise and unambiguous set of *metrics of process quality*, the resulting operational risk is low. However, when process quality itself is open to subjective interpretation, the operational risk is higher.

These findings help to shed light on the optimal governance structure for sourcing different kinds of processes. Aron and Liu propose a governance structure that they call the *extended organizational form* (EOF), where (1) the buyer contracts the production process to the provider; (2) the buyer can inspect the provider’s output quality *after* production; and (3) the buyer’s managers can also exercise partial managerial control over the provider’s agents by monitoring the quality of process execution *during* the production. This hybrid mechanism allows buyers to exercise some managerial control across the boundaries of the firm without waiting for a process cycle to be completed.

The paper concludes by comparing the efficiency in sourcing offshored services of the traditional in-house hierarchy, market-based outsourcing, and the EOF hybrid. The analysis shows that for relatively complex processes (as rated by the providers), the EOF is indeed the optimal governance choice and holds

the potential to unlock gains from wage and complexity arbitrage associated with offshore outsourcing. This organizational form contrasts with the more traditional hierarchical form used for the offshoring of call center work but may also discourage innovation that would improve quality and efficiency.

In his paper, Ashish Arora examines the growth and evolution of services offshoring in the global software industry. This experience is particularly interesting because software was one of the first skill-intensive industries for which production moved to relatively low-wage countries. This short paper draws from Arora's recently coauthored book, which provides extensive additional detail.

Broadly speaking, software activities can be divided into design, coding, and maintenance. Arora argues that the latter two of these are analogous to production and entail relatively low-end tasks. These, not design, account for most of the offshoring to date. He distinguishes between those who work in the software industry and the much larger number who work in software occupations outside of the "core" computer equipment and software services industries.

After providing an overview of the global software industry in terms of employment, sales, and exports, Arora describes how three countries, India, Ireland, and Israel, have emerged as centers of offshored software service through a combination of excess skilled labor, key innovations at the level of the firm, and good timing. In contrast, Brazil and China, the other two newcomers, have pursued a very different strategy, relying considerably less on exports, at least to date. Brazil has relied on a sophisticated domestic banking industry to generate demand, hoping that it will lead to the creation of an internationally competitive software industry. China appears to be following a more traditional import-substitution model.

Arora does not believe that the fast growth of export-oriented sectors in lower-wage countries yet threatens the supremacy of the United States as a producer of technology services. The continued importance of a close relationship between the producer and end-user of a software service, as well as the U.S. advantage in innovation-spurring institutions such as venture capital, suggests to him that offshored software services will remain concentrated in relatively low-value-added activities. But he recognizes that the sensitivity of this conclusion to factors specific to software production may leave workers in other potentially offshorable occupations feeling less secure.

In "Offshoring and Radiology," Frank Levy and Ari Goelman conclude that the much discussed reading of radiology images offshore by "cheap foreign doctors" is, to date, no more than an urban legend. Unlike software professionals, production workers, and call center operators, U.S. doctors (including radiologists) determine who qualifies as a doctor. Many radiology images are out-

the-job-training—a program that insures against earnings losses for permanently displaced workers who secure reemployment. Brainard and her coauthors estimate that it would cost roughly \$3.5 billion a year to insure permanently displaced full-time workers (who secure reemployment) for 50 percent of their earnings loss up to a cap of \$10,000 a year for two years.

The authors argue that although the U.S. labor market ranks second to none in job turnover, America's safety net for easing job transitions is one of the weakest among the wealthy economies. The main federally mandated unemployment insurance (UI) program contains so many restrictions that today only about 40 percent of all jobless workers receive benefits. Meanwhile, workers have long found it difficult, time-consuming, and expensive to prove that they are entitled to extended unemployment benefits under the nation's Trade Adjustment Assistance (TAA) program. Despite important reforms in 2002, TAA has helped fewer than 75,000 new workers per year, while denying more than 40 percent of all employees' petitions. And remarkably, the Department of Labor has interpreted the TAA statute as excluding service workers displaced by trade.

Arguing that workers' firm-specific skills are losing value at an accelerating pace in the face of offshoring and technological change, Brainard and her coauthors advocate supplementing the existing safety net with a new program that insures against wage loss, not just unemployment, for permanently displaced workers. Wage insurance would encourage workers to broaden their employment search and go back to work more quickly, while defraying the cost to employers of hiring and providing on-the-job training to new employees from different sectors. With wage insurance, the economy as a whole would benefit from shorter spells of joblessness and more efficient reskilling for workers.

A chief goal of wage insurance is to speed the reemployment of workers who have been permanently displaced. Wage insurance is most likely to have overall positive economic benefits if it targets workers whose earnings would otherwise fall dramatically as forces outside their control devalue their firm-specific skills. A Canadian pilot wage insurance program reduced unemployment durations by 4.4 percent, on average, according to research by the Social Development and Research Corporation. This could amount to hundreds of millions of dollars in annual savings on unemployment insurance payments in the U.S. context.

The authors emphasize that wage insurance also serves as a training subsidy for the worker's new employer. The retraining and new skills that a displaced worker receives on a new job benefit both the worker and the new employer. Finally, evidence suggests that wage insurance encourages workers to broaden their job search to new types of jobs in new sectors.

The authors estimate that the net cost of a fairly generous program that provides 50 percent replacement of lost earnings with a \$10,000 annual payment cap for two years would be \$3.5 billion a year, on average, which amounts to an insurance premium of roughly \$25 per worker per year. This is substantially less than the \$42.4 billion paid by the state and federal governments in unemployment insurance benefits in 2003. The authors project the costs of a wage insurance program for several different scenarios.

Brainard and her coauthors argue that a comprehensive, incentive-based safety net for displaced workers that encourages rapid reemployment and on-the-job training is a benefit for workers and businesses alike.

In the volume's final paper, Kimberly Clausing examines the role of U.S. corporate tax policy on offshoring behavior. Under the current system, U.S. multinational firms are taxed on their worldwide income, although tax credits are granted for taxes paid to foreign governments. Since profits are only taxed upon repatriation to the United States, this system provides an incentive to locate real economic activity as well as profits in low-tax countries. In addition, there is an incentive to avoid locating (and earning profits) in high-tax countries, because U.S. tax credits are limited to the U.S. tax liability. Recent changes in tax law under the American Jobs Creation Act of 2004 strengthen these incentives by further lightening the taxation of foreign income and by granting a temporary tax holiday, lowering taxes on repatriations of dividends from low-tax countries.

Clausing examines the incentives that are created by this system with respect to offshoring. *Ceteris paribus*, the U.S. tax system provides an incentive to offshore activities in low-tax countries and to offshore in-house rather than at arm's length. Substantial empirical evidence documents that U.S. multinational firms are sensitive to tax rate differentials among countries in their decisions regarding where to invest; this responsiveness is increasing, in part because of the increasing globalization of U.S. business. In addition, the previous empirical evidence indicates that multinational firms are sensitive to tax differences among countries when they decide where to book profits. Such sensitivity has implications for government revenues in the United States and elsewhere.

Clausing sees four potential goals for an international corporate tax system: enhancing efficiency, improving U.S. macroeconomic indicators, improving the competitiveness of U.S. multinationals, and generating government revenue. Most international tax systems reflect a balance of these goals, and these goals sometimes compete. For example, efforts to enhance the competitiveness of U.S.-based multinational firms may lead to an artificial tax preference

favoring economic activity and profits in low-tax countries. Also, some goals are easier to achieve with tax policy than others; attempts to use tax policy to enhance U.S. macroeconomic indicators or the position of U.S. financial balances may be misguided.

Finally, Clausing discusses the merits of several policy alternatives in the context of the current U.S. system and the policy goals. These alternatives include the adoption of a territorial system of taxing international income, under which foreign dividends would be exempt from taxation; the elimination of deferral of U.S. taxation on income earned in low-tax countries; and greater international coordination. All of these major changes would require important tradeoffs and should be made with caution. In the meantime, pragmatic smaller changes are likely to improve the functioning of the current U.S. tax system. Proposals to lower the corporate tax rate, broaden the tax base, strengthen enforcement, and simplify the tax system deserve close attention, because these changes would likely improve the performance of the U.S. tax system. Such changes could also help ensure that offshoring activities occur in a manner that enhances efficiency and is consistent with the national interest.