Working Paper Series

WP 07-2 APRIL 2007

Offshoring, Outsourcing, and Production Relocation—Labor-Market Effects in the OECD Countries and Developing Asia

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Abstract

This working paper evaluates the validity of available data on and the extent of the impact of offshoring on service-sector labor markets in the United States, EU-15, and Japan. A three-tier data validity hierarchy is identified. The impact of offshoring on employment in the three regions is found to be limited. Correspondingly, developing Asia is unlikely to experience large employment gains as a destination region. The paper highlights the case of the Indian IT industry, where the majority of job creation has been in local Indian companies rather than foreign multinationals. Domestic entrepreneurs have played a crucial role in the growth of the Indian IT-related service industry. However, increased tradability of services and associated skill bias in favor of higher skilled workers could have an uneven employment impact on developing Asia. Some high-skilled groups are benefiting and will continue to benefit dramatically from new employment opportunities and rising wage levels. Meanwhile, the same skill bias may eliminate many employment opportunities for unskilled or low-skilled groups in the region. Developing Asian countries therefore face a double educational challenge in the coming years: the need to simultaneously improve both primary and higher education.

JEL codes: F23, J21
Keywords: Service Sectors, Offshoring, Production Relocation, Data Source Validity, Automation, Highly Skilled Workers

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"*Outsourcing is a particular type of international trade. We are used to trade in goods, but trade in services has expanded recently, made possible in large part by advances in telecommunications. Like all forms of international trade, outsourcing benefits an economy overall, though there are also short-term costs as workers are displaced.*"

Greg Mankiw, Chairman, Council of Economic Advisers[1]

"India is a labour-oriented country, so we need more jobs that are secure…. [O]utsourcing does not lead to more efficiency. It creates complications in rendering good customer services."

R. J. Sridharan, General Secretary, All India Bank Officers' Association[2]

Few new topics in international economics have risen faster to the top of the political agenda, while simultaneously so poorly understood and quantified, than outsourcing in recent years. Also termed offshoring, international sourcing, production fragmentation, delocalization, production relocation, and even global supply chain management, this phenomenon's alleged hugely disruptive effects on employment have caused considerable concern among large groups of people and, by extension, politicians. Unfortunately, the near complete absence of valid empirical evidence on the phenomenon has allowed entrepreneurs and consultants to frame the debate to promote their own interests, thus fueling public anxiety. This working paper surveys the scattered empirical evidence gathered to date in the Organization for Economic Cooperation and Development (OECD) countries and attempts to draw from that evidence a number of conclusions regarding the present and future scope of the phenomenon's impact on employment. It gauges which economic actors could gain or lose in both OECD and developing countries. The empirical evidence in this working paper focuses on "production relocation" rather than the broader category of foreign direct investment (FDI) in an economy.

Section I provides the necessary terminology and presents the most important empirical findings to date in the United States, EU-15, and Japan. Section II surveys different estimates for employment potentially affected by offshoring and offshore outsourcing, while presenting estimates from detailed US information technology (IT) occupations indicating very extensive skill bias. The potential impact of automation on the service sectors is also evaluated. Section III considers the impact on developing Asia of the findings in sections I and II and presents data from India pointing to the domestic origin of most employment growth. Section IV concludes the working paper.

1. Comment in response to a question on "Ask the White House," December 5, 2003. See Mankiw and Swagel (2005) for an exposé on US politics in this subject.

2. Comment in "India Bank Workers Protest Outsourcing," *Financial Times*, July 28, 2006.

I. TERMINOLOGY AND EMPIRICAL FINDINGS

Terminology

A good starting point in the search for a framework for discussion of the phenomenon is the matrix developed by the UN Conference on Trade and Development (UNCTAD), among others, in its World Investment Report 2004. This matrix is based on the production location and ownership options facing a company (figure 1).[3]

Companies reorganizing their original nucleus of internal, domestic assets and deciding to relocate a captive unit for intermediate inputs to a foreign country subsequently offshore production. Companies choosing instead to rely on a domestic but external nonaffiliated producer outsource production, and those choosing to rely on an external nonaffiliated producer in a foreign country offshore outsource production.

The focus here is "production relocation"—i.e., instances of (1) total or partial closure of an enterprise's existing production units in one country with accompanying work force reductions, and (2) either the opening of affiliates abroad for the production of the same goods or services (offshoring) or the forging of a subcontracting contract with a nonaffiliated firm for production of the same goods or services in their home country (outsourcing) and/or abroad (offshore outsourcing).

OECD (2005a, section 5.4.2) makes a further useful distinction between two types of subcontracting.[4] The first one is commonplace "low-tech subcontracting" in areas such as catering, cleaning, transportation, or standard design of "nuts and bolts" intermediate inputs for various kinds of machinery. The second category concerns areas and items with far higher technological content, such as particular research studies, accounting, research and development projects, advertising, customer relations, or IT services. Here the supplying firm will not be delivering a standard good, but rather it must adhere rigorously to the primary manufacturer's technical specifications. This working paper focuses exclusively on the second category of subcontracting, which IT has in recent years increasingly made tradable across international borders, especially as a novelty also incorporating many low-wage countries.

It is important to note that production relocation forms only a (small) subset of the long-term increase in global FDI and expansion of the activities of multinational companies (UNCTAD 2004, 2005; OECD 2006a). The empirical magnitude of any impact of the broader rise in FDI on home-country

3. This working paper uses the terminology in this matrix.

4. It must be stressed that this section *OECD Handbook* concerns "areas of future investigations" and therefore does not represent a consensus view of definitions or terminology.

employment—i.e., of the "jobs forgone and never created at home in the first place because investments are located elsewhere" type—is outside the immediate scope of this working paper.[5]

The standard matrix presented in figure 1, and the accompanying terminology, suffers from theoretical incompleteness in the description of production location choices, in that it describes only the traffic on one side of the street so to speak—the arrows point only "outward," away from what is as a rule a high-wage country of origin. Implicitly, this matrix frames companies' production relocation choices in a globalizing world economy as a one-way movement—typically from a high-wage location to a low-wage destination.[6]

This incompleteness seems almost certain to have had a distortionary effect on the political discussion of production relocation in high-wage countries. Also, survey methodologies of empirical studies of offshoring and offshore outsourcing recurrently reflect this incompleteness. These studies typically cover only companies' decisions to relocate production abroad, while explicitly excluding measures of companies choosing to relocate production to, for instance, the United States or an EU-15 country—in other words, engage in (viewed typically from an OECD country) "insourcing/inshoring" of tasks and jobs. Several studies have attempted to focus on the "two-way street" of international engagement in another way in the United States, by highlighting the many jobs created in the United States by foreign investors. Many of these, however, are greenfield projects or results of mergers and acquisitions and therefore fall outside the narrower definition of insourcing/inshoring adopted here (see, for instance, Slaughter 2004 and Zeile 2005).

Figure 2 presents a more complete matrix of the production relocation options facing a multinational company. Unfortunately, this matrix is almost wholly theoretical in nature, in the sense that no major empirical study has so far attempted to implement this methodology in its entirety for production relocations. Very few studies (Jensen, Kirkegaard, and Laugesen 2006) come close, making empirical "net employment effect" estimations of companies' production relocation decisions extremely rare.
The reasons for the near complete empirical neglect "of the other side of the street"—inshoring and insourcing—are several. One is that the media (and by extension probably politicians) tends to focus almost exclusively on the "bad news of job losses," while ignoring the "good news of job creation." Another is that surveys of companies capturing the entire figure 2 matrix would have to be (1) very extensive, raising

5. Desai, Foley, and Hines (2004, 2005) establish that FDI by US multinational corporations (MNCs) is complemented by increases in the domestic capital stock of these MNCs, while confirming earlier findings in Feldstein (1995) that broader measures of FDI (i.e., including first-time FDI by non-MNCs) reduce domestic investments.

6. To a degree, this reflects a theoretical inability to cope with firm heterogeneity. The matrix in figure 1 is implicitly designed to describe the process, which occurs when a successful hitherto domestic-only OECD country–located small or medium-sized company expands to multinational status. This standard model does not capture the additional options available to companies that have already achieved multinational status, nor can it immediately describe the choices available to companies expanding internationally from a non–OECD country home base.

concerns of respondent burden, and (2) carried out over a very large population in order to cover a significant number of companies engaging in either (or both) types of sourcing and hence would be very costly.

Empirical Findings to Date

With public anxiety about jobs running high and in the absence of valid official statistical data[7] on the extent of the impact on employment of offshoring and offshore outsourcing, in particular, two broad types of proxy data sources have emerged:[8] "private consulting type estimates" and "press monitoring estimates." Both, however, possess inherent flaws.

"Private consulting type estimates"[9] are obtained typically from small population surveys of a particular private company's clients' previous actions and future intentions with respect to production location and ownership. Hence, these surveys are rarely based on samples that can reasonably be labeled representative, and the accompanying estimates and projections are frequently obtained with less than transparent methodologies.

Furthermore, the actual sample data and answers are almost always confidential and can hence not be queried or independently verified. This is particularly unfortunate given the obvious incentives for many private providers of such surveys—who also frequently advise their clients on how to implement production location strategies—to establish offshoring and offshore outsourcing as "the next big thing."

A comprehensive methodological critique and argument concerning (potential) "selection bias" in many of these "private consulting type estimates" is thus problematic, as they generally do not provide any information about their methodologies and data collection strategies. Indeed, this omission is itself the most important disqualifying factor. An influential example is Forrester Research, Inc. (2004a), which is an update on a frequently quoted 2002 Forrester Research note. It predicted that 3.3 million US service jobs will have moved offshore by 2015. The study actually provides a "methodology section" (reproduced in box 1).

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7. A 2004 report from the US Government Accountability Office on the availability of official US data on the subject had the telling title, "Current Government Data Provide Limited Insight into Offshoring of Services" (GAO 2004). Recently the MIT Industrial Performance Center Working Group on Services Offshoring reached the same result in its final report, stating as its second conclusion that "The data currently available for characterizing and measuring services offshoring have severe limitations" (Industrial Performance Center 2006, iv). See also GAO (2005a).

8. Domestic outsourcing, which encompasses the geographic shifting of jobs within a country with an immediately assumed first-order zero net effect on employment, is implicitly captured in official estimates of gross job gains and losses. See, for instance, the US Bureau of Labor Statistics Business Employment Dynamics Program at www.bls.gov/bdm/home.htm. It is not obvious that national authorities would have any use for or interest in gathering data on the employment impact of domestic outsourcing beyond this type of data, except when it is an automatic, if peripheral, creation arising from other data gathering activities.

9. See, for instance, Farrell and Rosenfeld (2005), Forrester Research, Inc. (2004a, 2004b), Boston Consulting Group (2004), Deloitte Research (2004), Roland Berger and UNCTAD (2004), and Global Insight (2004).

Box 1 Forrester's methodology

Inputs:

- Four trips to India
- 100+ user company best practices interviews
- 1,800+ surveys of North American businesses and IT leaders
- 300 vendor briefings
- 400 inquiries on offshoring
- Research with third-party sources

Steps in the update process:

- Update the baseline numbers by job categories based on 2002 Bureau of Labor Statistics data
- Reassess the four offshore growth curves and add year-by-year granularity for 2002–08
- Reevaluate the offshoreability of the different job categories based on:
  1) the nature of the work: Is it knowledge-intensive versus transaction-focused and to what degree is it process automated; 2) the skills available offshore; 3) offshore investments to support the process by third-party IT and business process outsourcing service providers.
- Internal peer review

A detailed discussion of the relationship between Forrester's results and the Bureau of Labor Statistics data can be found in Kirkegaard (2004), but suffice to say here that questions concerning (potential) selection bias when making economywide predictions could be raised with each individually listed input: Who are the 100+ companies interviewed? Are they large or small? Are they multinationals? Who are the 1,800+ industry participants surveyed? How is "vendor briefing" defined? Who inquired about offshoring and concerning what? Who are the third-party sources?

As such, studies of this type by and large represent the lowest level in the validity hierarchy of empirical data. Yet, this does not indicate that they cannot be useful, as they will frequently be the only data available—only that the user should proceed with caution.

"Press monitoring estimates"[10] are a systematic gathering of press reports concerning the offshoring or offshore outsourcing of jobs from a country. While this approach obviously depends crucially on the questionable assumption of complete press coverage, it does have the advantage that it relies on broadly verifiable public sources.

Two slightly different methods can be identified: scanning news media for reports either of all types of corporate restructuring or only of offshoring and offshore outsourcing related to corporate restructuring. The former method has the advantage of allowing comparisons of the relative importance of different causes of corporate restructuring—i.e., seeing if, for instance, people are being laid off due to corporate bankruptcies rather than offshoring and offshore outsourcing.[11]

10. See, for instance, Bronfenbrenner and Luce (2004), EFILWC (2004), Gerstenberger and Roehrl (2006), and Kirkegaard (2005).

11. If corporate bankruptcies and aggregate demand were the major problems, clearly the policy response to rising unemploy-

On the other hand, it is clearly very resource demanding and time consuming to systematically cover all types of corporate restructuring, and therefore the threshold for inclusion into the "sample of restructurings" will frequently be put so high, say at 50 or 100 layoffs, that much valuable information on smaller restructurings goes unrecorded. Such thresholds may dangerously bias the sample toward "big events," such as bankruptcies or plant closures (internal restructurings), which will tend to pass a high threshold in terms of layoffs, whereas smaller-scale events, say offshoring of part of the 50-employee company back-office, may not.

Therefore the "hard number" of layoffs caused by offshoring and offshore outsourcing from this broad type of media survey will likely be an underestimate. Yet, these studies—if sufficiently funded and carried out by independent organizations—should be viewed as the "middle rung" in the validity hierarchy of empirical data.

No systematic collection of official data by national or international statistical entities specifically targeting the employment impact of offshoring and offshore outsourcing, which would have constituted the top (i.e., broadly acceptable for academic work) rung of the data validity ladder, exists anywhere today. The closest in existence is "derived official data" from other current official data collection programs.

US Empirical Data

The US Bureau of Labor Statistics (BLS), as part of the Mass Layoff Statistics (MLS) Program, has collected such "derived official data" since 2004. The MLS program collects from administrative unemployment records and employer interviews data regarding the reasons for production establishment closings in the United States. As in most media monitoring estimates, the threshold for inclusion is layoffs of 50 or more employees.[12] BLS data can therefore be expected to suffer from a similar downward bias with regard to the actual number of layoffs.

Since 2004, the BLS has published data on the number of jobs lost in mass layoffs associated with both domestic and overseas relocations of production by US businesses. The total for the entire two-year period from 2004Q1 to 2005Q4 is presented in table 1.

Just under a million Americans lost their jobs as a result of unscheduled (i.e., excluding seasonal work and vacation periods)[13] mass layoffs, and approximately 12 percent of these layoffs can be attributed

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ment would include other measures than if it were mostly related to offshoring and offshore outsourcing.

12. For more information on the program, see the BLS MLS Web site at www.bls.gov/mls/home.htm. Also, as noted in Schultze (2004), the MLS datasets cannot, like this working paper, take account of "jobs forgone in America" via reduced hiring.

13. The inclusion of "vacation period" as a reason for mass layoff may seem a non sequitur but is related to the fact that the collection of MLS data is based on individual unemployment records, and a person may be eligible for unemployment benefits during the period a given plant is shut down for an extended holiday period.

to "movement of work"—i.e., domestic in-house relocation, outsourcing, offshoring, and offshore outsourcing. This 12 percent number is relatively large, although not as big a reason for mass layoffs as, for instance, "contract completion" (~25 percent) or downsizing (~16 percent) and roughly on par with layoffs due to "bankruptcy" and "financial difficulty" combined.[14]

It is possible, based on available data, to calculate the relative importance of the four types of "movement of work." However, given that detailed information regarding only 72 percent of the total number of relevant separations is available (line 4), estimating a precise "hard number of jobs lost" to either category of "movement of work" (lines 5 to 8) is not appropriate. Instead, the far right column of table 1 estimates the share of total separations associated with movement of work attributable to each category.[15]

Line 5 shows that more than half (55 percent) of all separations associated with "movement of work" is of the domestic in-house type and therefore have neither ownership nor international locational effects. They are therefore outside the scope of this working paper.

Line 6 shows that the apparent employment impact of offshoring as a result of domestic outsourcing only is very limited: only 1.4 percent of all separations. This number seems very low and possibly indicates that in most instances, domestic outsourcing has already occurred or is carried out without any large-scale loss of jobs. In lines 7 and 8, we see that the combined employment effects of offshoring and offshore outsourcing represent just 4 percent of all separations from mass layoffs in the United States in 2004–05, with in-house offshoring representing three-quarters.

The data presented in table 1 should obviously not be taken as the "definitive truth" on the employment effects of offshoring and offshore outsourcing, given the significant methodological shortcomings previously described. Yet, with the broadest and most valid available empirical evidence largely free of selection bias showing that just 1 in 25 US separations in mass layoffs can be attributed to either offshoring and offshore outsourcing, one cannot escape the conclusion that the heated public and political debate on the issue has been vastly overblown at least in the United States and that the direct employment effects are very limited. This is especially the case in the US economy as a whole, where very large numbers of jobs are constantly created and destroyed. The latest available data for 2005Q3 show that more than 8 million jobs were created, while 7.4 million were lost.[16]

However, it is important to note that this conclusion, reached on the basis of even the US BLS data—which is at the top of the data validity ladder—is a "snapshot," i.e., merely states what the status

14. For data on these and other reasons for mass layoffs, see detailed BLS MLS data available at http://data.bls.gov.

15. It is assumed in this estimate that the approximately 28 percent of separations, for which no detailed information is available, is distributed similarly to the 72 percent for which information is available. It is possible that employers not wishing to reveal their engagement in, for instance, offshoring actively try to hide this fact from BLS interviewers. This would cause the estimate in lines 6, 7, and 8 in table 1 to be downward biased by an unknown amount. However, was such bias to exist it would be extremely unlikely to be of a magnitude that would materially impact the conclusions drawn below.

16. See data for gross job gains and losses at the BLS Business Employment Dynamics Program at www.bls.gov/bdm/home.htm.

is at a given point in time. It does not consider any dynamic employment effects arising out of even this limited level of offshoring and offshore outsourcing. The almost inevitable "technology spillovers" from offshored or offshore outsourced production to foreign domestic companies may lead to increased competitive pressure in the US (or other rich-country) home market as well.[17] Such dynamic spillover effects may lead to adverse employment effects at competing home-country firms, if they as a result of increased foreign competition are forced to downsize or even go into bankruptcy. Due to the still very limited duration of time-series, none of the empirical data on offshore outsourcing presented in this working paper can reasonably be utilized to estimate these effects.

European Empirical Data

Turning to the empirical evidence in Europe, one is unfortunately forced to take a step down in the data validity hierarchy and instead of relying on "derived official data" make do with data from a "press monitoring estimate."

Since 2002, the European Commission has via the European Restructuring Monitor (ERM) financed the systematic monitoring of European newspapers and business press[18] for instances of corporate restructurings in all sectors of the EU economies leading to job losses. The threshold for inclusion is 100 job losses or at least 10 percent of the work force at companies employing more than 250 people. This means that, as was the case with the US BLS data above, these data are also likely to suffer from omission bias related to the threshold of inclusion.[19]

The most worrying additional bias in these data comes from the difference in the size of EU countries: Press coverage of restructuring events above the threshold in smaller countries seems more certain than in larger ones. It thus seems highly likely that a 100+ layoff would be reported in Luxembourg but less likely in the German press. For purposes of direct comparison with US data, only the results from 2004–05 are shown in table 2.

As with the US data, it is essentially meaningless to come up with a "hard number" for EU-15 job losses, given the methodological weaknesses of the data.[20] Instead table 2 estimates the relative impor-

17. Such spillovers in the service sectors seem most likely to occur as a result of the rapid employee turn-over in the sector seen, for instance, in the Indian offshore centers recently. Unlike in the manufacturing sector, where foreign technology blueprints and physical production facilities will frequently be relatively expensive for domestic competitors to copy (although of course nowhere nearly as expensive as developing them themselves), in many service sectors, when employees leave a foreign company, they may take with them "inside their heads" so to speak, many of the most important competitive parameters. These will be intangible things such as "knowledge of" the rich world's export market, multinational-company managerial techniques, or potential rich-world client base.

18. See the European Restructuring Monitor at www.emcc.eurofound.eu.int/erm for a complete list of covered media.

19. The potential downward bias from the inclusion threshold is even higher in these data than in the US BLS data. For a detailed description of included data, see the European Restructuring Monitor at www.emcc.eurofound.eu.int/erm.

20. Aubert and Sillard (2005), based on a different methodology utilizing data for individual firms and certain assumptions

tance of different reasons for industrial restructurings in the EU-15. Two things are immediately clear: First, at only a combined 5 percent of total covered job losses in the EU-15, job losses due to domestic outsourcing, offshoring, and offshore outsourcing are dwarfed in importance by job losses caused by corporate bankruptcies and internal restructurings (downsizings). Second, this limited employment impact is roughly equivalent to that recorded in the United States.[21]

It seems appropriate to state that the employment effects of offshoring and offshore outsourcing in the EU-15—like in the United States—have also been vastly exaggerated, as they are very limited.

The EU-15 data from the ERM offer two additional levels of relevant empirical detail, namely sector and country specificity. A breakdown of EU-15 job losses from offshoring and offshore outsourcing in 2004–05 reveals that manufacturing,[22] which made up only 18 percent of all total employment during 2004–05,[23] still dominates job losses, accounting for 56 percent of all job losses. However, service sectors—financial, information and communication technologies (ICTs), and others—accounted for the remaining 44 percent of job losses[24]—i.e., sectors traditionally thought to be less affected or unaffected by international trade do account for almost half the job losses. This topic is revisited in section II.
A breakdown of the EU-15 data into individual country data for job losses from offshoring and offshore outsourcing presents a reasonably valid capture of cross-country differences because the ERM data are collected in a similar way across all EU-15 countries.

Figure 3 shows an offshoring/offshore outsourcing intensity index for the individual EU-15 countries for 2004–05. The index is estimated as a ratio of the number of job losses in each country and total private employment in the country with the EU-15 average for the period equal to 100. It is evident in figure 3 that the intensity of offshoring and offshore outsourcing varies significantly within the EU-15, ranging from close to four times the average in Finland to effectively no impact in Greece and Luxembourg.

The detailed causes of these wide intra-EU-15 differences are outside the scope of this working paper, but in brief it seems that local, country-specific factors dominate. In the case of Finland, for instance,

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regarding relocations abroad, estimates that approximately 95,000 manufacturing-sector jobs were lost in France alone between 1995 and 2001.

21. Domestic in-house production relocation—in the ERM data in table 2 labeled relocation—is significantly smaller in the EU data at 1.5 percent versus 6.5 percent of covered job losses. However, given the much larger geographic size of the US domestic economy relative to individual EU economies, this is not surprising. Van Welsum and Vickery (2006) estimates based on a multivariate regression model that, for all OECD countries, only a very small number of terminations are related to offshoring and offshore outsourcing.

22. In the ERM data, manufacturing is defined as the sum of the chemical, construction and woodwork, electrical goods, food, beverages and tobacco, glass and cement, metal and machinery, motor, pulp and paper, and textile and leather sectors.

23. EU-15 manufacturing employment data are from the Eurostat Labor Force Survey at http://epp.eurostat.ec.europa.eu.

24. In the ERM data, the ICT sector is defined as the sum of the information technology and postal and telecommunication sectors. The financial services sector itself and "others" is a residual category.

the presence of low-wage and recent EU member-state Estonia, which has close cultural and linguistic ties to Finland, as a neighboring country can partly explain this country's high intensity score.

There does not seem to be a strong correlation between the intensity of offshoring and offshore outsourcing in individual EU-15 countries and the structural rigidities of their labor markets. Figure 4 (left axis) plots country offshoring and offshore outsourcing intensity levels and the score from the OECD for that country's employment protection legislation (EPL) concerning collective dismissals of the kind typically covered by ERM data. As can be seen from the near horizontal grey trend line in figure 4, there is essentially no link between the two variables.

Figure 4 (left axis) indicates that even countries with very heavy EPL against collective dismissals have not escaped the employment effects of offshoring and offshore outsourcing. Hence, attempts to protect jobs from offshoring and offshore outsourcing by making large layoffs increasingly difficult for employers seem to have very limited effect.

This apparent lack of a direct relationship may, however, mask differing dynamic labor-market developments over the course of the business cycle between countries with a very high EPL level and those with a lower level. For instance, in periods of cyclical expansion, companies in countries with very restrictive EPL can be expected to rely on offshoring or offshore outsourcing to a larger degree than those in countries with less restrictive EPL.[25] Companies in high-EPL countries can be expected to take advantage of offshoring in order to avoid the risk of being stuck with "unsackable workers" in the event of a cyclical downturn. This means that domestic cyclical labor-market swings as a result of offshoring and offshore outsourcing may become more pronounced in countries with lower levels of EPL, as domestic hiring occurs more readily. At the same time, more jobs will likely be permanently forgone in high EPL countries, which will be prone to chronically high levels of unemployment instead of cyclical labor-market swings.

Combining the cross-country variance in offshoring and offshore outsourcing intensity in the EU-15 with a measure of public anxiety over this issue from the EU-wide Eurobarometer public poll,[26] it can be shown that there is no statistical relation between the intensity of offshoring and offshore outsourcing in a country and its public's concerns regarding the phenomenon. This is illustrated on the right axis of figure 4.

The lack of a relationship between the "facts on the ground" and "public opinion" regarding offshoring and offshore outsourcing further underlines that the origin of the debate in the EU-15 is purely political.

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25. The German Chamber of Commerce—Germany is a restrictive EPL country—explicitly lists this as a major reason for the attraction of German companies toward offshoring to Eastern Europe. See "Working Longer to Save Jobs: But Will It Help Europe Close the Productivity Gap?" *Financial Times*, July 23, 2004.

26. The data is from Eurobarometer 63 from the spring of 2005. Like the ERM data, the Eurobarometer has the advantage of being collected in a uniform manner across all EU member states. See details of the program and data at the European Commission Web site, http://ec.europa.eu.

Finally it should be mentioned that at least one large-scale empirical study (Jensen, Kirkegaard, and Laugesen 2006) exists for an EU-15 country (Denmark) that incorporates both offshoring/offshore outsourcing and inshoring/insourcing decisions, making a "net employment effect" estimate possible. This study indicates that for a small, open economy with a labor market significantly more flexible than its neighboring countries in the European Union, the net employment effects of companies' production relocation decisions are indeed positive. It shows that offshoring and offshore outsourcing of predominantly low-skilled jobs in the manufacturing and IT sectors are more than offset by inshoring of higher skilled jobs in both the manufacturing and service sectors.

Japanese Empirical Data

Empirical data of the type utilized for the United States and the European Union do not seem to exist for Japan. Instead, this author finds only indirect evidence from data on broader categories of FDI and global production integration.

Japanese manufacturing companies have for decades been expanding their participation in global and particularly East Asian production networks concentrating in the machinery and transportation equipment sectors. Kimura (2005) cites several Japanese studies for the finding that outward Japanese FDI has had a small but negative effect on domestic manufacturing employment. Figure 5 seems to superficially confirm this finding. It shows domestic Japanese manufacturing employment and employment in overseas affiliates of Japanese manufacturing companies. From 2001Q2 to 2006Q1, domestic Japanese manufacturing employment declined by 1.3 million to 11.5 million, while employment at overseas manufacturing affiliates increased by 900,000 to 2.8 million. Figure 6 breaks down overseas affiliate employment by region.

The fact that employment at Chinese manufacturing affiliates accounts for more than 60 percent of the total increase and by 2005 surpassed ASEAN-4–located employment clearly indicates the rapid rise of China as the most important destination for labor-intensive Japanese FDI in the manufacturing sector.

Yet, data in figures 5 and 6 give only a tentative indication of the fact that production relocation via offshoring and offshore outsourcing in Japan is likely occurring or possibly accelerating. The decline in domestic manufacturing employment may have occurred predominantly due to accelerating labor productivity growth in the Japanese manufacturing sector. Japan and Iceland were the only two OECD countries where productivity growth (measured as value added per person employed) in the manufacturing sector was higher in 1995–2003 than in the preceding period 1990–95. From 1995 to 2003, Japanese manufacturing-sector productivity growth at just above 4 percent surpassed that of the United States.[27]

27. Due to very low productivity growth in the service sectors, overall Japanese productivity growth during this period, however, was significantly below that of the United States. Data from OECD (2005b).

Meanwhile, the rapid expansion of affiliate employment may be due to a need to serve new markets in, for instance, China from local production facilities. Such an interpretation is supported by the relative stability in the share of sales by Japanese overseas manufacturing affiliates going back to Japan—at about 9 percent from 2001 to 2006. Local sales make up an overwhelming 70+ percent of total affiliate sales, although showing a slight relative decline, offset by a relative increase in sales by affiliates to third countries.[28] In both cases any attribution of the observed domestic employment developments to either offshoring or offshore outsourcing would be erroneous.

A Ministry of Economy, Trade and Industry survey (METI 2006, 29) indicates the potential relative resilience of domestic Japanese manufacturing employment to offshoring and offshore outsourcing. The survey, which covers fiscal 2003, shows that the vast majority of Japanese manufacturing companies maintain their domestic production activities at the previous level following an expansion overseas. Sixty-four percent of the respondents (4,440 Japanese manufacturing companies) state that "overseas production has not affected domestic employment and production," while a further 19 percent reports that "overseas production has shifted domestic employment and production towards highly value-added products." In total more than 80 percent of Japanese domestic manufacturing employment thus seems unaffected by company expansion overseas. Only 6 percent of companies report that domestic plants have been closed and employment reduced, another 6 percent has decreased domestic production and reduced employment but avoided plant closures, while the remaining 5 percent of companies have decreased domestic production without direct job losses.

While systematic bias in the answers to this survey cannot be ruled out, as Japanese manufacturing companies answering the survey may have had an interest in hiding possible domestic layoffs, the survey does suggest the possible presence of complementarities in domestic and overseas investments by Japanese companies, similar to what Desai, Foley, and Hines (2004, 2005) found for US companies.

No employment data are available for Japanese FDI outside the manufacturing sector, although METI, based on a study of domestic employment growth and balance of payment statistics, in its White Paper on International Economy and Trade 2004 concluded that "[i]n the context of the services industry as a whole, both production value and employment figures position the professional and business services industry in Japan as an industry at the growth stage…. Japan's offshore outsourcing remains insignificant" (METI 2004, chapter 1).

In summary, data on the employment effects of offshoring and offshore outsourcing in OECD countries remain scarce. The little data that have been gathered from the most reliable derived official data and media monitoring exercises indicate limited direct employment effects of offshoring and offshore outsourcing to date: only 4 to 5 percent of total large-scale layoffs in the United States and EU-15. However,

28. Data are from the METI Survey of Trends in Business Activities of Japanese Foreign Affiliates (Kaiji Chosa).

just because the employment effects of offshoring and offshore outsourcing have hitherto been limited does not mean that they are not novel or would not have a potentially huge impact. The next section addresses this topic.

II. HOW BIG CAN IT GET IN SERVICES?

Production relocation, offshoring, and offshore outsourcing of jobs in the manufacturing sector have been occurring for decades (see, for instance, Lewis and Richardson 2001, Feenstra 1998, and Zeile 2003). However, with rapid technological development, investments in ICT infrastructure, accompanying declines in the costs of global communication, ongoing trade liberalization in many service sectors (via gradual implementation of the General Agreement on Trade in Services [GATS] schedule as well as unilateral and bilateral liberalizations), and the emergence of new low-wage suppliers of skilled labor (most noticeably India), international sourcing of IT and ICT-enabled business services—such as customer relations services, back-office services, and numerous professional services—has risen rapidly. Estimates of the industry's growth vary substantially, but one indicator is the rise in global revenues of the Indian software and IT-enabled service sector. According to the Indian IT industry association NASSCOM, these revenues have risen at a compound annual growth rate of 28 percent since 1999 to more than $28 billion in 2005 (NASSCOM 2006a).

This section will provide—in the words of Van Welsum and Vickery (2005)—an overview of the "outer limits" of the potential employment impact of this new development in the nonmanufacturing, service sectors, while illustrating the emergence of deepening skill bias in IT employment, and contemplate the effects of possible automation of service jobs.

Gauging "Potentially Affected Employment"

In earlier periods when offshoring and offshore outsourcing were almost exclusively occurring in the manufacturing sector, it was straightforward to quantify the potential employment effects of the trend by viewing the share of employment in the manufacturing sector as the "outer limit." While any prediction of almost complete disappearance of employment (though not necessarily output) in the manufacturing sector in any OECD country is of course extreme, this approach did make considerable short-term political sense in that laid off manufacturing workers could be encouraged to seek employment in the allegedly unaffected (and much larger in employment terms) service sectors. However, as services have become more tradable[29] and offshoring and offshore outsourcing have spread to the service sectors (see section I

29. For excellent empirical descriptions of this rise in tradability of services, see annual data for US trade in services available at www.bea.gov.

above showing 44 percent of layoffs in the EU-15 are in the service sectors), such a simple sectoral demarcation of the potential employment effects is no longer tenable.

Instead careful consideration must be given to the precise impact and intensity of the use of IT throughout the highly heterogeneous service sectors. Rather than using a sectoral demarcation as before, identifying the most affected occupations—i.e., specific job categories across sectors—is now the most fruitful approach. However, as the vast majority of statistical employment data are collected on a sectoral basis, this means that once again researchers face significant data constraints.

With the study of the occupational impact of offshoring and offshore outsourcing still in its infancy, no consensus view has so far emerged regarding the choice of criteria by which "occupations affected by offshoring and offshore outsourcing" should be identified. Several, sometimes overlapping, suggestions have been made. Van Welsum and Vickery (2005) list the following criteria:

- people holding jobs where they are likely to make intensive use of ICTs to produce output;
- their output can be traded/transmitted with the help of ICTs (ICT-enabled trade in services);
- the work has a high explicit information or "codified knowledge" content (and no or little tacit or implicit knowledge); and
- the work does not necessarily require face-to-face contact.

In addition, the authors, inspired by Bardhan and Kroll (2003), list the following potentially important criteria, not explicitly taken into account: (1) a high-wage differential with similar occupations in destination countries; (2) low set-up barriers; and (3) low social networking requirements.

Based on these criteria, the authors estimate that in 2003 the sum of identified potentially affected occupations made up 19.2 percent of total employment in the EU-15, 18.6 percent in Canada, 19.4 percent in Australia, 18.1 percent in the United States (2002 data), and 13 percent in South Korea (2002 data).[30] In all cases, except South Korea, this share is larger than the total share of employment in the manufacturing sector.[31] In other words, in the affected occupations, offshoring and offshore outsourcing potentially have a very large effect on employment.

Other studies using different methodologies have reached different but still large estimates. Bardhan and Kroll (2003) calculate 11 percent of US employment in occupations potentially affected by offshoring in 2001. Garner (2004) estimates 10 percent of total US employment in potentially affected occu-

30. Van Welsum and Vickery (2006) note that Korea is in the process of revising its occupational classification system, which is expected to have a material impact on the estimated share of potentially affected employment.

31. Manufacturing-sector employment in 2003 was as follows: EU-15, 18.6 percent; Canada, 14.6 percent; Australia, 11.4 percent; United States, 13.3 percent (2002); and South Korea, 19.1 percent (2002). *Source:* OECD Labor Statistics and Eurostat Labor Force Survey.

pations in 2000. Farrell and Rosenfeld (2005) estimate 11 percent of US service-sector employment is theoretically affected but only 2 percent actually will be affected by 2008. Blinder (2005, 2006) adopts a hybrid sectoral-occupational approach and focuses on the split between personally and impersonally delivered services and estimates that up to 21 percent of US employment in 2004 may be potential candidates for offshoring or offshore outsourcing. Jensen and Kletzer (2005) adopt a spatial clustering approach, where industries and occupations highly clustered within the United States are assumed to be internationally tradable. They estimate that 17.5 percent of US employment is in jobs where both industry and occupation are tradable.

Levy and Murnane (2004, 2006a, 2006b) emphasize that for a job to be offshored or offshore outsourced, it (1) could be done anywhere and (2) must concern information that can be exchanged between the client and the offshore producer without misunderstandings—i.e., must be largely rule-based. They (wisely perhaps) do not offer numerical estimates but contend that the majority of jobs relocating in the future will be such rule-based middle-skilled jobs.

In short, most estimates of employment potentially affected by offshoring and offshore outsourcing indicate that the share is larger in the service sectors than in the manufacturing sectors.

"Affected Jobs" Do Not Equal "Jobs Lost" to Offshoring and Offshore Outsourcing

Technological advances especially in the ICT sector have, as noted, been instrumental in increasing the tradability of services in recent years.[32] However, several studies indicate that technological change concerning computers also may have another, far bigger and disruptive impact on labor demand. Autor, Katz, and Krueger (1998), Autor, Levy, and Murnane (2003), and Falk and Koebel (2004) with data from the United States and Germany, respectively, show that increases in computer capital in nonmanufacturing industries are closely related to non–trade related declines in the demand for low-skilled workers and routine tasks.

This dual role and simultaneous effect of IT, facilitating both the increased tradability of services as well as a non–trade related increase in the destruction of low-skilled jobs through automation, raises the risk that offshoring and offshore outsourcing will be blamed for disruptions in OECD-country labor markets far above their actual impact, not least due to the difficulty—keeping in mind the absence of the targeted empirical data collection illustrated in section I—of disentangling these dual effects. Hence the risk that "potentially affected jobs" come to represent "jobs lost/to be lost to offshoring and offshore outsourcing."

32. This section builds extensively on the analysis found in Mann and Kirkegaard (2006).

An illustration of this issue can be found in the recent employment developments in US IT-related occupations, all of which in the studies listed above are included in the group of "potentially affected occupations."[33]

Table 3 looks at the developments in net employment in low- and high-wage US IT-related occupations from 1999[34] to mid-2005, and as can be seen the trends are dramatically different. Low-wage (a reasonable proxy for low-skilled) IT-related employment in occupations earning on average significantly less than the US average wage, in areas such as call centers, data entry, and word processor typing, declined by more than a third, or by more than 750,000 jobs. Yet, at the same time employment in high-wage (a reasonable proxy for high-skilled) IT-related jobs in occupations earning about twice the US average wage, in areas such as software engineering and network administration and analysis, increased by 18 percent, or almost 400,000 jobs.[35]

Total net employment in the selected US IT-related occupations being down by more than 350,000 over the period masks two highly diverging employment trends in affected IT-related occupations, namely that (1) low-wage/skilled US IT jobs are disappearing faster than even blue-collar US manufacturing-sector jobs;[36] and (2) high-wage/skilled US IT-related jobs continue to be created at a pace five to six times faster than the growth of the total US work force.[37]

This finding leads to two additional themes. First, it is not immediately possible to estimate how much of the decline in low-wage/skilled employment is due to offshoring and offshore outsourcing and how much is due to technological innovation itself. However, keeping in mind the findings in section I, but also factors such as the very high overall productivity growth in the US service sectors[38] in the period and its links to IT capital deepening,[39] it seems at least probable that the latter dominates. Hence, many

33. Table 3 for illustrative and recognition purposes uses detailed 4-digit BLS Occupational Employment Statistics (OES) data, which are significantly more detailed than any of the listed studies. However, in all relevant cases, the higher-level less-detailed occupational categories to which those listed in table 3 belong are included in the "potentially affected categories."

34. Some degree of arbitrariness exists in the selection of a starting year for this type of calculation. By choosing 1999, a deliberate attempt is made to "slice the peak of the Internet boom off" and achieve a starting point approximating "sustainable employment levels." US total employment by the end of the March–November 2001 recession was back at the approximate level of late 1999. Total US nonfarm employment in December 2001 equaled 130.7 million, while in December 1999 it was 130.5 million. *Source:* US BLS Current Employment Statistics (CES) data.

35. US average—not to be mistaken for the largely stagnant median—wages increased from $32,800 in 1999 to $37,900 in 2004.

36. The much-publicized decline in the number of production workers in the US manufacturing sector from 1999 to May 2005 was "only" 24.7 percent (US BLS CES data).

37. It grew only approximately 2.5 percent over the period (US BLS CES data).

38. Van Ark (2005) shows that US productivity (measured as GDP per hour worked) in ICT-using services from 1995 to 2003 rose by an average annual 5.3 percent, as opposed to only 1.7 percent in the EU-15, accounting for almost the entire difference in overall productivity growth between the two areas.

39. See, among others, Jorgenson and Stiroh (2001).

more low-skilled IT-related jobs in the United States seem to have been destroyed by technological innovation than lost to offshoring and offshore outsourcing.

Second, table 3 shows that it is quite possible for high-wage/skilled job categories to be widely regarded as "affected by offshoring and offshore outsourcing," while maintaining rapid employment growth. Yet, looking at specific categories of high-wage/skilled US IT-related employment, computer programmers[40] have experienced significant net declines of more than a quarter in employment. Meanwhile, higher-wage/skilled software engineers[41] have experienced large increases of more than 50 percent in employment, so that indeed there has never been more software engineers employed in the United States than now (mid-2005 data).

It is subsequently possible to speculate that at least some of this increase in employment in the highest-wage/skilled US IT-related occupations may be a result of inshoring and offshore insourcing (see figure 2) of this type of highly specialized work to the United States from other countries. Ironically, such a scenario would create a positive effect on employment in these highest-wage/skilled occupations from being potentially affected by offshoring and offshore outsourcing. The prospect of overall improved employment opportunities in occupations affected by offshoring and offshore outsourcing is also found in Amiti and Wei (2005, 2006), who use different data.

According to table 3, substantial skill bias in employment is affecting ICT-intensive occupations potentially affected by offshoring and offshore outsourcing. Job destruction is rapid among lower-wage/skilled and even select high-wage/skilled jobs, while job creation continues to be brisk among the highest-wage/skilled jobs. This does not mean, however, that even the highest-wage/skilled jobs are entirely unaffected by the potential for offshoring and offshore outsourcing. Some evidence suggests that such occupations, which in terms of employment opportunities were effectively immune to the business cycle, may now have become far more cyclical than during earlier business cycles (illustrated in figure 7).

The figure shows how the unemployment rates of US IT-related occupations during the 1991 recession never went above 4 percent and until 2000 were generally less than half the overall US unemployment and close to essentially full employment (allowing for a small amount of transitional unemploy-

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40. Job classification is defined in the OES as: 15-1021 Computer Programmers: Convert project specifications and statements of problems and procedures to detailed logical flow charts for coding into computer language. Develop and write computer programs to store, locate, and retrieve specific documents, data, and information. May program web sites.

41. The two job classifications for software engineers are defined as: (1) 15-1031 Computer Software Engineers, Applications: Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. Exclude Computer Hardware Engineers (17-2061). (2) 15-1032 Computer Software Engineers, Systems Software: Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. Apply principles and techniques of computer science, engineering, and mathematical analysis. *Source:* US BLS OES Program, www.bls.gov/oes.

ment). However, during the 2001 US recession, unemployment in US IT-related occupations not only rose to unprecedented levels but actually rose above the overall unemployment level. Subsequently, it declined dramatically in 2004–05 to again reach its historical level of full employment at approximately 2 percent.

How much of the spike and subsequent rapid decline in unemployment in IT-related occupations is due to increased tradability and offshoring and offshore outsourcing, and how much is due to a large number of probably ultimately insufficiently qualified people entering these occupations during the IT boom of the late 1990s and exiting after the bust, a number that cannot be immediately determined? Figure 7 does, however, suggest that US IT-related occupations, even among the highest-wage/skilled, which were to a large extent unaffected by unemployment may now be facing a far more "normal job market," where short-term spells of unemployment cannot be ruled out during recession periods.[42]

This interpretation of the data—that the labor market for IT-related occupations is starting to behave more like a regular cyclical labor market, at least partly as a result of the increased tradability of IT-related services—corresponds with the description in Bhagwati, Panagariya, and Srinivasan (2004), among others, of offshoring and offshore outsourcing as simply an expansion of trade into new areas. Indeed many high-skilled IT-related workers in the United States have since 2000 faced a "new situation" of possible short-term unemployment. However, this group should probably be viewed as entering a situation of "normal labor-market circumstances" rather than one where employment opportunities are unavoidably and irreversibly disappearing.

Increased Tradability as a Step Toward Automation?

The dual role of IT as facilitating both tradability of services and destruction of employment of low-skilled workers points to a further future impact on service-sector employment—that of automation. Levy and Murnane (2006) conclude that "At least for the moment, there is a strong overlap between the jobs threatened by globalization and the jobs threatened by computerized work." Agreeing with this conclusion, one can ask how long this overlap of jobs being offshored or offshore outsourced and automated will last before automation completely takes over.

As Levy and Murnane (2004, 2006) point out, one of the most important things that makes service-sector tasks and jobs increasingly tradable and possible to offshore and offshore outsource—namely that they can be described in relatively simple rules—is also the very thing that frequently makes it possible for a computer to substitute for a human in processing information and performing the task/job. Therefore

42. This also partly reflects the fact that a far larger share of people in US IT occupations today work in "normal non-IT related" sectors of the economy. Mann and Kirkegaard (2006) present estimates that upto two-thirds of the US IT occupation work force are today employed in non-IT producing sectors.

it may be appropriate to start viewing offshoring and offshore outsourcing as merely a temporary middle stage before many of these tasks are completely automated. Even the lowest-cost human labor cannot realistically compete against the lowest-cost labor of all, namely computers themselves.

Research by IBM and Datamonitor[43] indicates that average costs per customer interaction (for instance, a call to a company representative) costs approximately $6, if the receiving company employee is located in a high-wage country. Offshoring such services (for instance, call centers) to India reduces costs by up to 50 percent to just about $3 per interaction. However, relying instead on email-based communication saves a further perhaps 10 percent on costs, relative to the costs of a rich-world agent. Yet, utilizing even more IT to replace humans and implementing interactive voice response services, automated speech recognition, or Web-based self service lowers costs by up to 90 percent.

Evidently, while there may be very large labor cost savings related to offshoring and offshore outsourcing from a rich country to, for instance, India, these savings are again dwarfed by the savings available to companies relying wholly or partly on computers to carry out the interaction. With the ongoing rapid development of speech-recognition technology, it seems probable that an increasing number of companies will switch to automated computer-handled customer relations,[44] making the offshoring and offshore outsourcing of such tasks merely a midpoint.

This does not mean that employment in the destination countries for offshored and offshore-outsourced services is facing any immediate large-scale impact from automation of service tasks, but it does indicate that the required skill threshold for possessing a "secure job" in high-wage countries has seemingly been driven higher in recent years by both offshoring and offshore outsourcing and IT itself. So will technology in the future also gradually raise the skill threshold for the type of jobs that cannot be automated in the service sectors and therefore are potential profitable candidates for offshoring and offshore outsourcing? Offshore destinations for services, too, will therefore constantly need to improve the skill level of their workers and cannot hope to rely chiefly on expanding low-wage work forces as their principal appeal. This may in the long term have some employment impact on developing Asian countries, a topic that will be developed in section III.

In summary, section II has shown that occupations "potentially affected" by offshoring and offshore outsourcing make up very large shares of OECD-country employment. Yet, rather than a uniform decline

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43. IBM estimates partly derived from author conversations with IBM representatives and also referenced in the IT Review: Voice Recognition Section, *Financial Times*, May 4, 2005, and "Whatever Happened to Customer Service?" *USA Today*, September 26, 2003. Datamonitor estimates cost savings from offshoring to India at 30 percent and from automation at 80 percent. See also Karen Bannan, "Ernestine, Meet Julie," *CFO Magazine,* January 1, 2005.

44. See, for instance, "Technology Quarterly," *The Economist*, December 6, 2001, and Katie Hafner, "A Voice With Personality—Just Trying To Help," *New York Times*, September 9, 2004. This author can testify to this development in his own retail bank (Citibank) and wireless phone company (Cingular), where in 2003 depending on the time of day his call was received by a representative in either the United States or India. Today, he reaches a voice-recognition menu irrespective of the time of day.

in such employment, affected work forces in rich countries are experiencing a rapid movement away from low-wage/skilled jobs toward higher-wage/skilled employment. Data from the United States suggest that in recent years this movement has happened faster in IT-related occupations than among blue-collar workers in the manufacturing sector. IT has facilitated this shift toward higher-wage/skilled employment, through both increased tradability of services and technological innovation independently. The same IT may in future lead to increased automation of some service-sector tasks, highlighting the need for skill upgrading among work forces in offshoring and offshore outsourcing destinations.

III. IMPACT ON DEVELOPING ASIA

The impact on developing Asia of the topics covered in sections I and II comes in three main areas: (1) direct employment impact of production relocation and offshoring and offshore outsourcing; (2) increased tradability of services and accompanying skill bias; and (3) the possible premature emptying of the appropriately priced pool of talent in developing Asian countries.

Direct Employment Impact

Section 1 revealed that production relocation and offshoring and offshore outsourcing have had only a relatively minor impact on OECD-country labor markets. The flip side of the coin is that potential destination countries in developing Asia have not seen a huge inflow of such jobs. Even allowing for significantly more labor-intensive production in recipient countries (see below and Farrell and Rosenfeld 2005), the number of jobs terminated in origin countries is so relatively low that the magnitude of jobs received is nondramatic seen from the perspective of recipient countries. The International Labor Organization (ILO 2006, 23) notes that in 2003 the entire work force of the Indian IT industry—of which, as will be shown below, far from all work at multinational companies—accounted for only two-tenth of 1 percent of the country's labor force.

Furthermore, as almost the entire cost savings from offshoring and offshore outsourcing decisions typically come from wage differentials, there is an upper limit to just how much more labor intensive low-wage destination-country production can become, relative to home-country production, while still representing a profitable business decision. And with a larger number of staff in an initially low-wage destination country, companies will be even more sensitive to rises in wage costs.

In short, entrepôt economies aside, in all likelihood developing countries in Asia will not get a broad and significant employment boost from offshoring or offshore outsourcing per se. Even India, by far the most successful destination for offshored and offshore-outsourced IT service jobs, as well as the economy

best positioned to reap by far the largest future direct employment gains from offshoring and offshore outsourcing, has not achieved such a boost.[45]

According to NASSCOM (2006a),[46] India's IT industry trade body, industry employment grew from 284,000 in fiscal 1999–2000 to 1,287,000 in fiscal 2005–06 at the rate of roughly 200,000 people per year.[47] Some of this employment growth would have been for servicing the small, but growing, domestic Indian IT market, but a large majority would have occurred in the export-oriented sector. NASSCOM reports that in fiscal 2005 exports accounted for $17.7 billion of the total IT services and software revenue of $22.6 billion, or almost 80 percent.[48]

More importantly, though, revenue statistics for the Indian IT service sector (figure 8) show that the largest share of employment growth in the Indian IT service export sector is a result of the highly successful growth of indigenous Indian IT companies—such as Tata Consulting Systems, Infosys, Wipro, and Satyam to name the top four—rather than the relocation of production to India by foreign multinationals.

Of course, such ownership demarcation between domestic and foreign owners in a highly globalized and dynamic industry is only a snapshot: India-located IT companies are constantly bought and sold across borders. For instance, in November 2004 GE sold its Indian technology service subsidiary, GECIS,[49] while in April 2004 IBM bought the Indian call-center and back-office service provider Daksh eServices for $150 million.[50] Keeping this caveat in mind, it can be seen in figure 8 that Indian companies dominate the largest IT-enabled service segment, while foreign multinationals[51] are larger in the smaller business process outsourcing (BPO) segment of IT services. Assuming that local Indian IT service com-

45. See, for instance, A. T. Kearney (2004) for this estimate. For a perhaps slightly biased view, see NASCCOM-McKinsey (2005).

46. NASSCOM data are clearly at the lowest level of the data validity hierarchy described in section I.

47. Fiscal year equals the period from April to March.

48. Some uncertainty surrounds NASSCOM's export data for Indian IT services and software, which are, for instance, frequently up to 10 times as high as the corresponding US import data. See GAO (2005b) for elaboration on this issue. This discrepancy is rooted in the fact that NASSCOM collects data from members in a form that is not completely compatible with the IMF balance of payment data collection standards. Due to the on-site (in export markets) delivery model (GATS mode 4) of many Indian companies, many "export revenue" figures reported by NASSCOM will be located in the "compensation of employees" section in IMF-compatible data. See also Reserve Bank of India (2005) for a new and smaller number for Indian IT services exports. While important in trade terms, this issue is not so relevant in the employment/revenue terms utilized here, as the fact that most employment/revenues are export-oriented is unaffected.

49. The buyers of 60 percent of the company were two US-based private equity funds, so strictly this transaction would not have shifted ownership between domestic Indian and foreign.

50. See "Merger Fever Breaks Out in Bangalore," *BusinessWeek*, April 26, 2004,.

51. Looking at NASSCOM's membership list as off December 31 2005, "Global IT Majors" include (nonexhaustive listing) such household names as Adobe Systems, Ebay, CSC, EDS, Google, HP, IBM, Microsoft, Oracle, SAP, Sun Microsystems, and Yahoo. "Captive BPO Units" include operations for Accenture, Alstrom, AXA, BT, CapGemini, Capital One, Dell, Deloitte, Ford, GE, HSBC, Lehman Brothers, McKinsey, Robert Bosch, Samsung, Siemens, the World Bank, and ThyssenKrupp. *Source:* NASSCOM (2006b).

panies dominate the domestic Indian market, figure 8 indicates that only approximately 23 percent of employment in the Indian IT service sector is with foreign multinationals.[52]

Moreover, the link between figure 8's export revenue and employment shares is not necessarily even close to one-to-one. Given the reasonably sound assumption that multinationals will be more capital intensive than local Indian start-up companies, figure 8 probably thus represents a low estimate of the distribution of India-based employment. However, speculating further about what share of the approximately 23 percent of Indian IT sector employment with foreign multinationals is the result of relocated jobs and offshoring and offshore outsourcing and what share is from expanding their Indian operations and integrating them globally is in all probability futile without additional data.

It is nonetheless evident that the tremendous employment success in recent years of the Indian IT service sector is at least as much and probably more the outcome of domestic entrepreneurs, rather than foreign multinationals, tapping into the "India advantage" of a large high-skilled, English-proficient talent pool. The term "domestic entrepreneurs," though, must be qualified, given the huge influence returnees from the mostly US-based Indian IT-sector diaspora have had on the growth of the domestic Indian IT industry.[53]

The internationally competitive and heavily export-oriented Indian IT industry emerged in the 1990s in a broad climate of domestic economic liberalization[54] and therefore—unlike older sectors of the Indian economy—was very lightly regulated. The industry is centered predominantly in large Indian metropolitan areas, most importantly Bangalore, Hyderabad, Chennai, Delhi, and Mumbai. Many IT company "campuses" in India possess infrastructure (reliable power supply, roads, and telecommunications) far superior to the surrounding areas and therefore fulfill a role close to a traditional export-oriented "special economic zone."[55] It is therefore very unlikely that such "campuses" could have thrived outside these metropolitan areas,[56] because this is where the skilled labor they employ exist in large numbers.

In summary, limited relocation of offshoring and offshore outsourcing jobs and dominance of job creation in metropolitan cities in the Indian IT industry suggest that in developing Asian countries, employment development paths in the IT service sector, and the service sector more broadly, will be radically different from those in the manufacturing sector since the 1960s.

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52. This result is the weighted average of the total revenue figures for Indian and multinational companies in figure 8.

53. In 2003 the Indian government acknowledged this influence with the launching of a number of initiatives aimed at the overseas Indian diaspora, especially one primarily for science and technology professionals. See http://stio.nic.in/. It is too early to evaluate the effect of these government initiatives.

54. See Srinivasan (2003) for an overview of liberalizing reforms since 1991.

55. Such zones were initially proposed in India only as late as 2003. See draft law for special economic zones at http://sezindia.nic.in/draft_central.asp. Their actual introduction in 2006 aroused substantial political furor in the country. See "India's Special Economic Zones," *The Economist*, October 12, 2006.

56. It should be noted, though, that with labor costs rising rapidly in places such as Bangalore, the Indian IT industry is starting to spread out into other larger cities. Recall here that India has at least 25 cities with more than 1 million inhabitants.

While the broader developmental benefits of IT service industry growth of the scale seen in India in recent years are self evident—tens of thousands of new high-paying jobs are good for any economy—the results in this section (and box 2) strongly suggest that the IT sector as an export sector alone cannot replicate the large job gains seen in manufacturing even if it became a large exporter of these new tradable services. The employment impact of IT services will be similar to that of manufacturing only if the use of IT services was broadened to other parts of the domestic developing Asian economies.

Domestic use of IT services in developing Asia is all the more required as the most successful multinational IT service providers from developing Asia—Tata Consulting Systems, Wipro, and Infosys, to name a few—continue to grow in new markets and may replicate the global business model of their main OECD competitors. This means that these IT service companies as a result of their own success will expand their operations and commercial presence outside their home countries. Box 2 suggests that commercial presence abroad is a substitute rather than a complement in the IT service sector. Hence, successful foreign expansion by domestic multinational IT service companies—for example, Wipro or Infosys expanding their commercial presence and work forces rapidly in the OECD countries—will present de veloping Asian home countries with some of the same concerns over the accrual to the domestic economy in an era of globalization of (no longer) full income from capital and labor usage in the IT sector.

Increased Tradability of Services and Accompanying Broadening Skill Bias

It was demonstrated in section II how technology has facilitated tradability, offshoring and offshore outsourcing, and probable elimination of many low-skilled jobs through ongoing automation. While this increases productivity and therefore is welfare enhancing in the long run, the associated skill bias in services has distributional consequences in that it may restrict some groups' access to the expanding economic pie.

As the quote from the Indian bank employees' labor union at the beginning of this working paper illustrates, this novel tradability may impact hitherto unaffected (protected) service occupations and sectors in developing Asia's labor markets in ways similar to what has happened to US IT-related occupations. This novel tradability can therefore be viewed as a functional equivalent of legislated and negotiated liberalization through domestic reforms and the World Trade Organization (WTO).[57]

A possible decline in the availability of some low-skilled service jobs—or more realistically a less steep increase in the growth thereof—will pose a challenge for several developing Asian countries, where very large parts of the labor forces are still employed in agriculture (figure 9). This is particularly so as the spectacular rise of the Chinese labor-intensive manufacturing sector in recent years has limited the po-

57. The cited case from the Indian banking sector is a result of principally domestic economic liberalization. Given the suspension of negotiations in 2006, the WTO agenda is uncertain.

Box 2 Potential impact of the GATS on IT-related services

The General Agreement on Trade in Services (GATS) constitutes a crucial (if unfortunately back-seat) part of the Doha Round of WTO negotiations, which at the time of writing were "in hibernation" and facing an uncertain future. Even though this working paper focuses on the labor market, it is relevant to briefly consider the impact the GATS has already had on trade in services and the impact it could have. At least two of the four modes of service supply defined in the GATS[1] (modes 3 and 4) have direct effects on member states' labor markets.

So far commitments made under the GATS have been significantly deeper and more liberalizing in mode 3 (commercial presence) than those in mode 1 (cross-border trade).[2] This situation led Mattoo and Wunsch (2004, 16) to conclude that broadly speaking, "the current market opening features of the GATS emulate a foreign investment agreement rather than allowing for trade in the traditional cross-border sense." Given that traditionally the overwhelming share of services has been regarded as nontradable, deeper liberalization in mode 3 (and 4) through, for instance, opening up for foreign direct investment in more service sectors is preferable when viewed from the perspective of the larger efficiency-enhancing economic impact of the GATS. If countries really wish to improve productivity in their domestic service sectors through the GATS, liberalizing mode 3 would almost invariably have a far larger effect than liberalizing mode 1.

However, given that IT-related services have in recent years undergone a technology-induced "tradability revolution," is the above statement still true for this sector in isolation? Certainly, global mode 1 trade in IT-related services has risen dramatically in recent years.[3] However, has global trade in mode 3 IT-related services also changed, and if so by how much?

It is a well-established empirical fact in the United States (the only country for which comparable data for total service trade in both modes 1 and 3 are available for a longer period) that when considering services as a whole, mode 3 trade, approximated by sales of services through majority-owned foreign affiliates,[4] has in recent years significantly outstripped traditional mode 1 cross-border exports. In 2004 the latest available data show mode 3 at $490 billion, fully 50 percent larger than mode 1 trade ($328 billion) for all services combined. The corresponding "US import side" figures in 2004 were $257 billion in mode 1 and $387 billion in mode 3.[5]

Recreating comparative data for modes 1 and 3 trade in IT-related services only is highly problematic, given the general dearth of such data and the concerns over respondent confidentiality when countries do collect them. Again, the United States is the only country with relevant data for both modes 1 and 3, and even here, constructing a comprehensive time-series is difficult, due to instances of data suppression by the US Bureau of Economic Analysis.

Box figure 1 attempts a comparison of US trade in IT-related services in both modes 1 and 3.[6] The figure compares US mode 1 cross-border trade in "computer and information services" and compares it with mode 3 trade (sales by US majority-owned foreign affiliates [MOFA] and by foreign majority-owned US affiliates [MOUSA]). Two things stand out from the figure. First, despite the "tradability revolution" in IT-related services, US mode 1 trade in these remains relatively stagnant.[7] Second, while the data series for mode 3 is "extremely spotty," it is clear that the magnitude of US mode 3 trade in IT-related services is much higher than cross-border mode 1 trade. For US exports in 2004, the ratio is close to 9:1, while for US imports the ratio is approximately 3.5:1. Compared with total services with a ratio of

1. These are (1) cross-border trade, (2) consumption abroad, (3) commercial presence, and (4) presence of national persons.

2. See WTO (2001). The distinction between modes 3 and 4 is frequently somewhat blurred, and hence this statement is true, relative to mode 1, for both modes 3 and 4.

3. According the IMF's Balance of Payment Statistics (October 2006), total global exports from 108 reporting countries of the more narrowly defined "computer and information services" reached $95 billion in 2005, more than a doubling since 2000.

4. Most available data differentiate between "foreign affiliates," which require more than 10 percent (foreign) ownership, and "majority-owned foreign affiliates," which require 50 percent or more. As the "nationality implications" of just a 10 percent foreign ownership share are uncertain, all utilized data in this working paper refer to "majority-owned foreign affiliates." See BEA (1995) for details of referenced US data. Less complete data for other OECD countries are available in OECD (2005c).

5. Only in 1996 did US mode 3 sales in services surpass mode 1 exports, while on the import side, this occurred in 1989. Source: Bureau of Economic Analysis, table B, www.bea.gov/bea/di/1006serv/tabB.xls (accessed December 22, 2006).

6. Box figure 1 is taken from a presentation by the author at the UNCTAD/ILO/OECD Expert Meeting on ICTs and Development, December 5, 2006. All included data are from the US Bureau of Economic Analysis's most recently available data on trade in services.

7. Note that mode 1 trade in this figure includes both affiliated and unaffiliated trade.

(box continues next page)

Box 2 *(continued)*

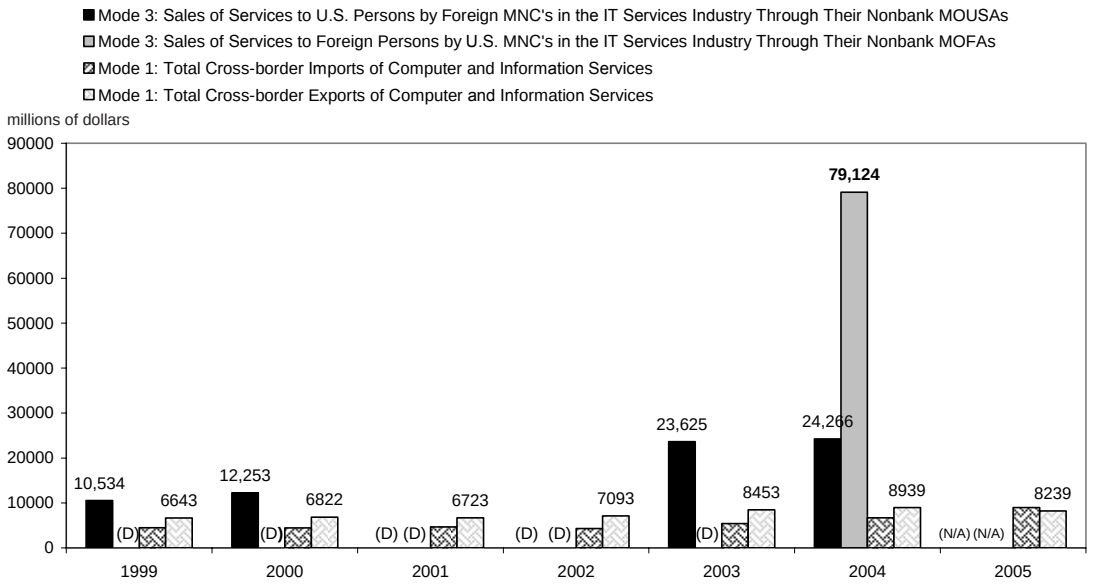
just 1.5:1, the US IT service sector is thus far more reliant—both on the import and export sides—on mode 3 service trade.

This has several implications. First, the relative stability of cross-border mode 1 trade in computer and information services when compared with larger and rising mode 3 trade suggests the two are substitutes rather than complements for—crucially—both US exports and imports.

Second, when mode 3 remains the dominant channel for both imports and exports in the US IT-related service sector, this again suggests that foreign providers of IT-related services in the US market must continue to expand their commercial presence in the United States, in just the same manner as US IT service firms have done in their foreign markets. This further points to a situation where the home countries of new multinational providers of IT-related services, such as India in the cases of Wipro, Tata Consulting Systems, or Infosys, will not continue to accrue the same share of total income from capital and labor utilized in the IT service industry as before if the heavy focus on exports is maintained.

Third, the dominance of mode 3 trade in US IT-related service trade suggests that even if the Doha Round is successfully concluded as it looks now, it may not make much difference for trade in the IT service sector. This is related to both the hitherto paucity of member state offers in the IT service sectors and the exclusion of the "Singapore issues" from the negotiations. Only a renewed effort by WTO members to ensure investment and establishment rights and thus expansion of mode 3 trade in IT services will have the desired trade-enhancing effects. Breakthroughs in other individual service sectors may improve the prospects for additional benefits in these sectors, too.

Box figure 1 Computer and information services, US modes 1 and 3 trade, 1994–2004
(millions of dollars)



Note: (D) indicates that data have been suppressed by the BEA for confidentiality reasons. "IT services industry" is defined as sum of "Software publishing," "Internet service providers, web search portals, data processing services, internet publishing and broadcasting, and other information services" and "Computer system design and related services."

N/A = not available
MOFAs = majority-owned foreign affiliates
MOUSAs = majority-owned US affiliates

Source: US Bureau of Economic Analysis, *Trade in Services*, tables at www.bea.gov/bea/di/intiserv.htm.

tential for large-scale moves out of agricultural employment and into low-skilled manufacturing for other developing Asian countries. Furthermore, accelerating skill bias in service employment will pose a threat to the substantial unskilled work forces in several developing Asian countries (figure 10).

Any decrease in the employability of developing Asia's work forces arising from increased tradability and automation in services raises the risk that the region may find it increasingly difficult to escape what has for most East Asian countries been a period of "lower employment elasticity growth" (percentage increase in employment associated with a 1 percentage point increase in GDP growth) in the 1990s compared with earlier periods.[58] If this slowdown in East Asian employment growth were to deepen, the region will find it increasingly difficult to reap the full economic benefits of its growing labor forces in the coming decade(s), where millions of young people will continue to enter the regional job markets. For instance, assuming constant labor force participation rates at 2003 levels for the 15-to-64-year-old population (available in ADB 2005) and then utilizing the medium population projections from the UN World Population Prospects Database (esa.un.org), India faces an increase in its labor force of a staggering 90.7 million during the decade 2005–15, China faces 56.4 million, Indonesia 15.3 million, Vietnam 9 million, the Philippines 8.3 million, Thailand 3 million, and Malaysia 2.5 million.

In sum, tradability of services and technological innovation and associated skill bias risks could curtail the possibilities for developing Asian countries to achieve broad-based and therefore politically stabilizing employment growth in the future.

Emptying the Competitively Priced Skill Pool Too Early?

Even if the direct employment effects of offshoring and offshore outsourcing have not been dramatic in overall scope for developing Asian countries, demand especially for skilled professionals and middle managers has increased. Farrell and Rosenfeld (2005) find that foreign multinationals tend to employ more than twice the ratio of middle managers to entry-level service agents at offshore locations than in their home-country operations.[59] Unsurprisingly therefore this group of workers has experienced rapid wage increases in the fastest-growing countries in recent years,[60] and most multinationals, as well as local companies in India, have started complaining about the costs of retaining this crucial group of employ-

58. See ADB (2005), Kapsos (2005), and ILO (2006). See also "Efficiency Made at the Cost of Workers' Interest," *China Daily*, August 30, 2006, for estimates that the employment elasticity in China has declined from .453 in the 1980s, to .11 in the 1990s, to .098 in 2000–2004.

59. This will partly be a direct result of the need to minimize the risk of miscommunication between units located on different continents, especially if dealing with direct customer interaction.

60. The *Hewitt Global Salary Planning Report 2006* estimates that real wage increases in 2005 for the group of "Specialists, Professional Staff and Junior Management" rose 2.5 percent in Thailand, 2.6 percent in Hong Kong, 3.2 percent in Taiwan, 3.3 percent in Singapore, 3.4 percent in Malaysia, fully 6.3 percent in China, and a whopping 11.4 percent in India. Compare these with a corresponding only 0.4 percent in the United States in 2005.

ees.[61] NASSCOM-McKinsey (2005) even projects a potential 500,000 shortfall in qualified skilled Indian employees by 2010 should current growth rates continue.

Moreover, despite huge headline numbers, several studies indicate that the number of high-skilled workers in India and elsewhere who will be capable of working for an OECD multinational—and by extension probably any local company in direct competition with them—is significantly smaller than many believe.

For instance, McKinsey Global Institute (2005), based on interviews with multinational human resource professionals, human resource agencies, and executives, estimates that only 13 percent of low wage–country university graduates may be both suitable and geographically available for work in a multinational company.[62] Among the Asian countries covered, only 10 percent of Chinese engineers, for instance, are estimated to be potential hires, rising to 20 percent of engineers in the Philippines, 25 percent in India, and 35 percent in Malaysia. Agarwal (2006) estimates that up to 40 percent of India's graduates are unproductively employed and shows that the country indeed has an unemployment rate that rises with educational attainment.

Meanwhile, OECD (2006b) makes it plain that, in the face of an adverse demographic outlook, most developed countries are rapidly making it substantially easier for high-skilled workers to immigrate to OECD countries. As such, despite a tendency for many OECD countries to increasingly restrict overall levels of immigration, the opposite is the case for high-skilled people.

Kirkegaard (2005b) finds evidence from the US H-1B visa program—which requires that benefiting entrants into the United States have at least a bachelor's degree[63]—that intensive corporate users of this program in the US IT sector pay a large group of high-skilled immigrants substantially above prevailing US wages.[64] These companies pay a premium to these foreign entrants to the US labor market, presumably for possessing a unique skill set. This clearly indicates that a global labor market for certain high-skilled occupations is emerging.

Therefore, it may be stated that not only is the available talent pool in many developing Asian countries significantly smaller than many would believe based on headline numbers of graduates but also op

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61. In the 2006 20-F filings with the Securities and Exchange Commission (SEC), leading listed Indian IT companies—Tata Consulting Systems, Infosys, Wipro, and Satyam—all state rapidly rising wages in India as having an adverse impact on profits and being sufficiently prominent to mention in these filings as a "major risk." See filings at the SEC Web site, www.sec.gov.

62. A weighted average of 28 low-wage countries covered in McKinsey Global Institute (2005).

63. The H-1B program is based on employer sponsorship so that any would-be immigrant for whom the US-based employer is willing to sponsor a visa can enter and work in the United States for up to six years. However, to prevent wage dumping, the program requires that US employers pay the immigrant no less than the prevailing wage for similar workers in the local area. See Kirkegaard (2005b) for an elaboration.

64. However, other studies of US H-1B wages in IT occupations, such as Miano (2005), find to the contrary that wages for H-1B visa holders in IT-related occupations are substantially below prevailing US median wages for these occupations.

tions are expanding for many high-skilled people to move to OECD countries to earn much higher wages than would be possible in their home countries.

Freeman (2006) illustrates this very point from "the other (demand) side," when he succinctly rebuts the fears of a looming high-skilled labor shortage in the United States by highlighting the need to look at the global supply of high-skilled workers:

> The lesson from the 1990s increased employment of science and engineering workers is clear: if the US economy demands more highly skilled workers in the period of projected slow labor force growth, it can increase supplies by admitting more immigrants in areas of rising labor demand, as it did in the 1990s. The supply of highly educated persons overseas, many of whom major in science and engineering, suggests that as long as the US is an attractive place to work and is open to immigration, it *cannot* [emphasis in original] experience a shortage in the science and engineering workforce" (Freeman 2006, 15).

Evidently, this has already had a huge positive effect of significant real wage increases for the high-skilled group in question (see footnote 60) and multinational companies in general pay a nontrivial wage premium over local employers.[65] Subsequently, scarce locally available talent (those not possessing the desire to become an entrepreneur) can be assumed to principally seek employment at such multinational companies.

To avoid a scenario where available skilled professionals and middle managers price themselves "out of the domestic market," due to their exclusive global opportunities for employment either with multinational companies or overseas, developing Asian countries must rapidly raise the quantity and quality of higher (particularly tertiary) education. Such an improvement should be made predominantly in the domestic education system. Simply sending more students overseas on scholarships will not produce the desired impact, as many students on such scholarships may not wish to return home due to expanding OECD-country employment opportunities.

Yet, as illustrated in the case of the Indian diaspora, whose partial return to India has given a huge boost to the Indian IT industry, making more talent available at home should never be at the expense of preventing highly skilled people from leaving. Instead, a dynamic domestic business environment capable of luring talent—domestic or foreign—to relocate should be created.

In a world economy increasingly characterized by tradability of services and ensuing skill bias in favor of higher skilled workers, such an environment will prove crucial to generate growth opportunities for domestic developing Asian service companies capable of competing against global multinationals. Ignoring the Indian IT majors for a minute and looking at the UNCTAD listings of the largest develop

65. See, for instance, Graham (2000) and Lewis and Richardson (2001).

ing-world multinationals,[66] it becomes clear that so far no developing country has spawned any significant multinational company outside the manufacturing sector and incumbent government-run monopolies.

Such potential inability, at least partly due to rapid wage inflation for skilled professionals, of developing Asian countries to generate internationally successful companies in the most rapidly expanding sectors of the global economy is in itself troubling. It can unfortunately be expected to provide the basis for continued calls for protectionism in the service sector—despite the Indian experience that it is domestic companies in open competition with multinationals that provide the largest employment effects (figure 8)—which could have damaging ripple effects on the prospects of global and bilateral trade negotiations.[67] Such calls for protectionism in the face of allegedly superior foreign competitors would regretfully mirror the behavior of many other special interest groups, most noticeably of course OECD farmers.

Moreover, increasingly unequal access to the "opportunities of the globally integrating economy," indicated by a broadening skill bias for service occupations and sectors, and rapidly rising wages for high-skilled professionals in many countries are increasing income inequality.[68] With the majority of high-skilled service-sector employment likely to occur in metropolitan areas—such as is occurring in India—heterogeneous developing Asian countries face the additional distributional risk of economic development becoming more uneven in geographic terms. This lopsided development may aggravate the type of political instability seen in, for instance, Thailand, pitting economically advanced capital/metropolitan regions against underdeveloped outer areas.

IV. SUMMARY AND CONCLUDING REMARKS

This working paper has attempted to gather the available empirical evidence from the main OECD countries to gauge the extent of production relocation, offshoring, and offshore outsourcing in their labor markets. The paper develops a three-tier validity hierarchy of available empirical data. Incomplete evidence in both the United States and EU-15 indicates that this phenomenon has had only a minor effect, with less than 5 percent of major layoffs in 2004–05 attributable to it.

In the EU-15, the majority of layoffs still occur in the manufacturing sector, although 44 percent now occur in services. Significant differences exist in the intensity of offshoring and offshore outsourcing among individual EU-15 countries, and these differences are uncorrelated with structural labor-market policies as well as the level of public anxiety.

66. UNCTAD, *World Investment Report 2005*, appendix table A.I.10. The OECD *Information Technology Outlook 2006*, appendix 1, reaches the same inescapable conclusion when looking at ICT multinationals only.

67. It is a recurring sticking point in US bilateral trade negotiations that developing countries are unwilling to grant US service companies the market access they desire.

68. The United Nations University WIDER database, www.wider.unu.edu/wiid, reports generally widening income inequality in East Asian countries in the late 1990s, reversing earlier trends of low and stable levels of income inequality.

Japanese data show rising overseas employment in manufacturing-sector affiliates in Asia, especially in China. Survey data indicate that this rise is related mostly to servicing the local market, rather than the result of production relocation from Japan. Likewise the decline in domestic Japanese manufacturing employment in all probability is mostly due to accelerating productivity in the domestic Japanese manufacturing sector.

Section II surveys different approaches for estimating the share of OECD employment potentially affected by offshoring and offshore outsourcing especially in the service sectors. Results from different methodologies indicate that more jobs—roughly between 10 to 20 percent of total employment—may potentially be affected in the service sectors than in manufacturing in most OECD countries.

Far from being an irreversible trend of declining employment, however, detailed data on US IT-related occupations indicate that "being potentially affected by offshoring and offshore outsourcing" rather implies a rapidly deepening skill bias affecting these types of employment. Low-wage/skilled IT-related jobs are swiftly disappearing, while high-wage/skilled IT-related jobs continue to be created at a brisk pace. Evidence is further presented that high-wage/skilled US IT-related occupations were more vulnerable to rising unemployment during the 2001 recession than during earlier cycles, possibly indicating that this group of workers is entering a novel "cyclical labor market."

Technological innovation has hitherto facilitated both offshoring and offshore outsourcing, as well as induced related nontrade skill bias. As the development of new technologies, for instance, voice recognition software, continues, there is considerable potential for automating many tasks that are today potential nominees for offshoring and offshore outsourcing. This indicates that the skill level of tasks and jobs likely to be relocated will also be driven gradually upward, requiring an equal upgrading of destination-country work force skills if job growth there is to be maintained.

Developing Asian countries will not have seen a dramatic inflow of jobs through offshoring and offshore outsourcing, and data from the most successful destination country in IT services, India, indicate that the majority of job creation has been in local Indian companies rather than in foreign multinationals. This development, and the fact that most jobs in India so far have occurred in metropolitan areas, points out that employment growth from globalization in the service sectors is likely to be very different from what developing Asia experienced in the manufacturing sector.

In services, domestic or multinational companies operating in the local market, rather than export-oriented firms, will create by far the most number of jobs. This means that successful domestic economic reforms and liberalization—much more than the ability to attract foreign investment for export industries—will be what guarantee employment growth and economic success. The rise of the service economy in developing Asia may therefore require quite a dramatic change in focus to the domestic service economy from the earlier emphasis on exports in manufacturing.

Increased tradability of services and associated skill bias arising from offshoring and offshore outsourcing pose employment creation challenges for those developing Asian countries, where a significant share of populations are still in agricultural production and possess limited skills. Such population groups risk facing considerable obstacles in entering rapidly globalizing service sectors and therefore remaining separated from major vibrant parts of their domestic economies. Thus, this trend may result in increasing inequality in both economic opportunities and incomes in developing Asia.

Despite limited employment growth resulting directly from offshoring and offshore outsourcing in developing Asia, key groups of skilled professionals and junior managers in booming countries like China and India have experienced substantial wage increases in recent years. This highlights the issue that, despite large headline numbers of high-skilled graduates, only a small group may be able to actually gain employment at a multinational or similar local company. Deep-pocketed multinational companies ultimately possess a significant advantage in chasing a scarce resource.

This advantage could—in the absence of significant improvements in the domestic education system—hurt the creation, and stunt the growth to multinational status, of domestic service-sector companies in developing Asia. Such stunted growth of developing Asia's service-sector companies will not, based on the Indian experience, be for a lack of entrepreneurial talent, although it is not clear that many other countries are as well endowed with a huge diaspora as is India. It could nonetheless occur if the supply of high-skilled talent from the region's domestic education sector is not increased.

Developing Asian countries therefore face a double educational challenge in the coming years. If they are to challenge incumbent service-sector multinationals, not only must a large group of the populations in several countries be taught more than basic numeracy and literacy to be employable outside the agricultural sector but also many more workers must acquire the advanced skills needed to staff domestic service companies.

Offshoring and offshore outsourcing, and increased tradability of services and associated skill bias, will as all trade have an uneven employment impact on developing Asia. Some high-skilled groups are benefiting and will continue to benefit dramatically from new employment opportunities and rising wage levels. Meanwhile, the same skill bias may eliminate many employment opportunities for unskilled or low-skilled groups in the region.

The broader future policy challenge for developing Asia arising from this phenomenon will not be so much to generate economic growth itself—continued economic liberalization and growing labor forces will to a large degree ensure that—but to guarantee political stability during economic growth by ensuring that its benefits and opportunities are distributed reasonably evenly among different groups and geographic regions. Addressing this challenge will not be easy—many OECD countries, most noticeably the United States, are struggling with the same challenge—but will be required for long-term growth and stability.

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Table 1 US job losses from mass layoffs associated with domestic and overseas production relocation, 2004Q1–2005Q4

1	Total number of separations, excluding seasonal and vacation related	974,078
2	Total number of separations associated with movement of work	116,205
3	Percent share of total separations	11.9
4	Total number of separations associated with movement of work for which employers were able to provide specific information regarding the movement of work component (72 percent of 116,205)	83,683
5	Percent share of separations associated with movement of work domestically and within company (domestic inhouse relocation)	54.9 (6.5)
6	Percent share of separations associated with movement of work domestically and to a nonaffiliated producer	11.9 (1.4)
7	Percent share of separations associated with movement of work internationally and within company (offshoring)	26.3 (3.1)
8	Percent share of separations associated with movement of work internationally and to a nonaffiliated producer (offshore outsourcing)	6.9 (0.8)
		100.0 (11.9)

Note: Share of total separations (974, 078) in parentheses.

Sources: Brown (2004) and quarterly BLS MLS news releases, www.bls.gov.

Table 2 Total EU-15 job losses, by type of restructuring, 2004-05

Type of restructuring (ERM definition)	**Share of total jobs lost/planned reductions** (percent)
Outsourcing (when the activity is subcontracted to another company within the same country)	0.4
Relocation (when the activity stays within the same company but is relocated to another location within the same country)	1.5
Merger/acquisition (when two companies merge or during an acquisition which then involves an internal restructuring program aimed at rationalizing organization by cutting personnel)	4.2
Offshoring/delocalization (when the activity is relocated or outsourced outside of the country's borders)	4.5
Bankruptcy/closure (when an industrial site is closed or a company goes bankrupt for economic reasons not directly connected to relocation or outsourcing)	16.2
Internal restructuring (when the company undertakes a job-cutting plan, which is not linked to another type of restructuring defined above)	73.0
Other	0.1
Total (1,084,662 job losses included)	100.0

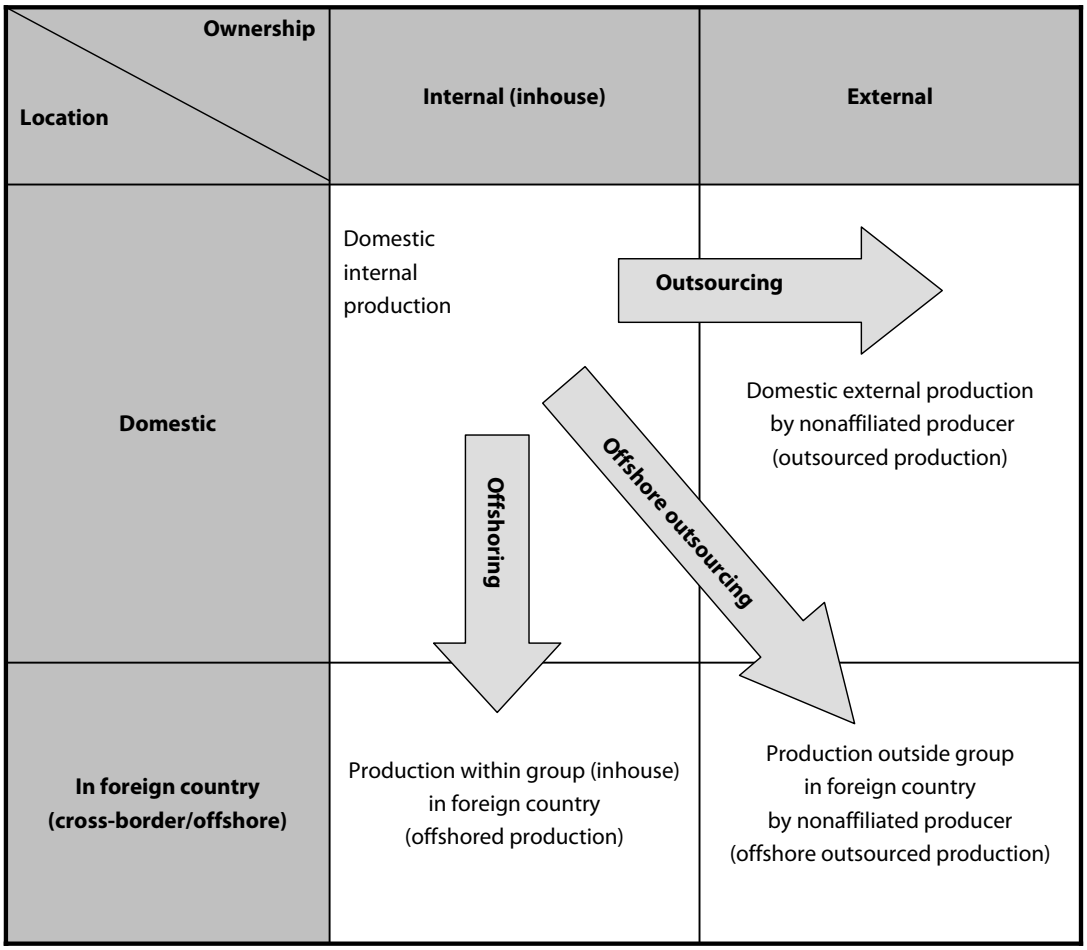
Source: European Restructuring Monitor, www.emcc.eurofound.eu.int.

Table 3 Detailed US IT-related occupations, 1999 and May 2005 (number of workers)

Occupation	1999	May 2005	Total change	Percentage change	Annual wage, May 2005 (dollars)	Annual real wage change, 1999–May 2005 (percent)
Call center type occupations						
Telemarketers	485,650	400,860	–84,790	–17.5	23,500	–1.1
Telephone operators	50,820	29,290	–21,530	–42.4	31,030	–0.2
Low-wage technology workers						
Switchboard operators, including answering service	248,570	194,980	–53,590	–21.6	23,020	–0.1
Computer operators	198,500	129,160	–69,340	–34.9	33,580	0.5
Data entry keyers	520,220	296,700	–223,520	–43.0	24,910	0.3
Word processors and typists	271,310	153,580	–117,730	–43.4	30,140	1.4
Desktop publishers	37,040	29,910	–7,130	–19.2	34,770	–1.0
Electrical and electronic equipment assemblers	387,430	207,270	–180,160	–46.5	27,150	1.5
Semiconductor processors	42,110	44,720	2,610	6.2	32,870	0.5
Total call center and low-wage technology workers	**2,241,650**	**1,486,470**	**–755,180**	**–33.7**	**26,446**	0.2
Mid-level IT workers						
Computer support specialists	462,840	499,860	37,020	8.0	43,380	–1.3
High-wage technology workers						
Computer and information scientists, research	26,280	25,890	–390	–1.5	94,030	4.3
Computer programmers	*528,600*	*389,090*	*–139,510*	*–26.4*	*67,400*	*1.1*
Computer software engineers, applications	287,600	455,980	168,380	58.5	79,540	0.8
Computer software engineers, systems software	209,030	320,720	111,690	53.4	84,310	2.0
Computer systems analysts	428,210	492,120	63,910	14.9	70,430	1.0
Database administrators	101,460	99,380	–2,080	–2.1	65,590	1.6
Network and computer systems administrators	204,680	270,330	65,650	32.1	63,210	1.8
Network systems and data communications analysts	98,330	185,190	86,860	88.3	64,970	0.0
Computer hardware engineers	60,420	78,580	18,160	30.1	87,170	2.5
Electrical engineers	149,210	144,920	–4,290	–2.9	76,060	1.3
Electronics engineers, except computer	106,830	130,050	23,220	21.7	79,990	1.8
Total high-wage technology workers	**2,200,650**	**2,592,250**	**391,600**	**17.8**	**73,504**	1.6

Source: Bureau of Labor Statistics CES data, 1999, 2000, 2001, 2002, May 2003, November 2003, May 2004, November 2004, and May 2005 National Occupational Employment and Wage Estimates.

Figure 1 Standard offshoring and outsourcing matrix for production relocation



Source: Adapted from UNCTAD (2004, table IV.1).

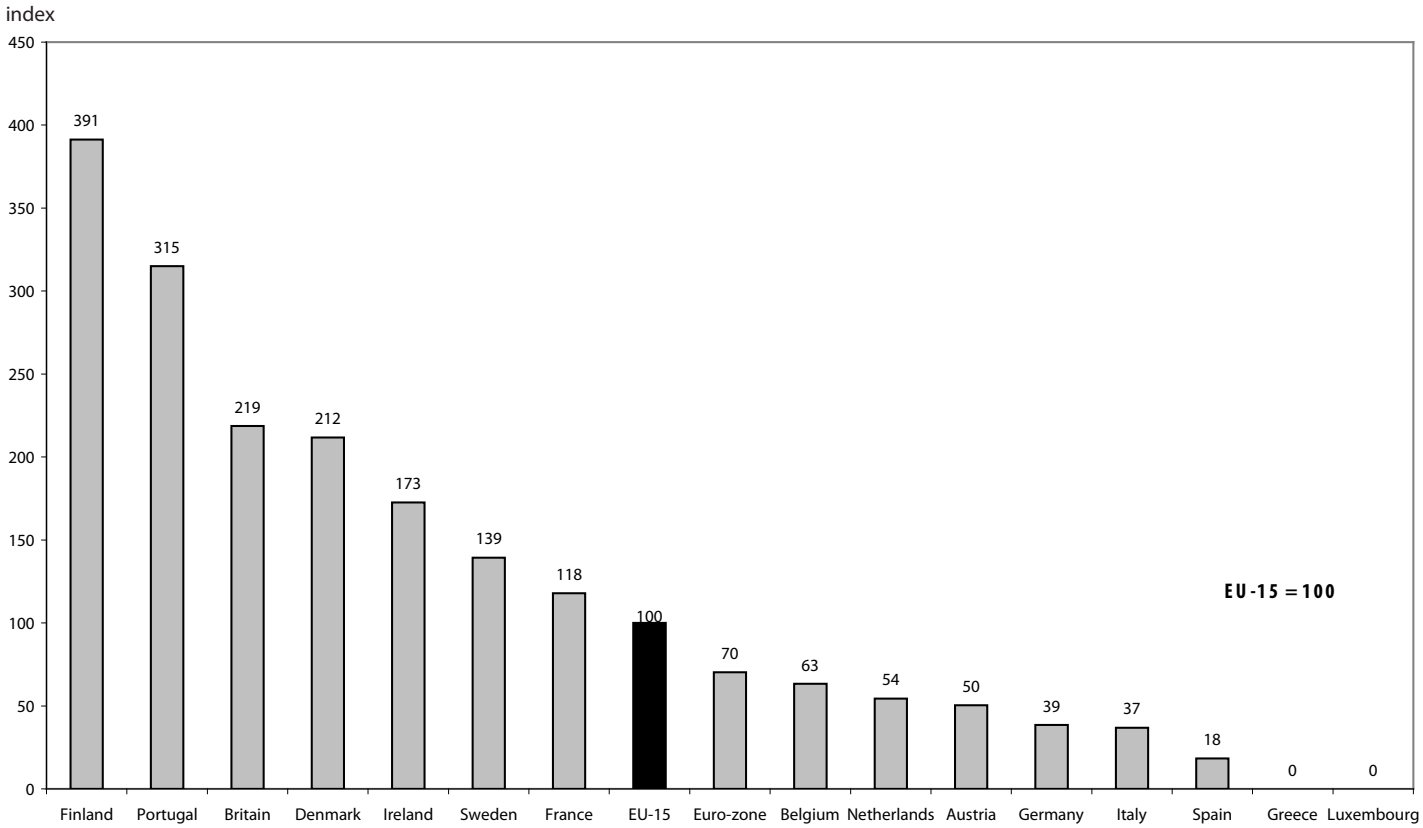
Figure 2 Complete production relocation options matrix

		Location			
		Domestic (movement within a country)		**Foreign** (movement between countries)	
		Inhouse	Nonaffiliated	Inhouse	Nonaffiliated
Type of sourcing	**Outsourcing**	To other inhouse domestic production location	Domestic outsourcing: To other domestic nonaffiliated production location	Offshoring: To foreign inhouse production location	Offshore outsourcing: To foreign nonaffiliated production location
	Insourcing	From other inhouse domestic production location	Domestic insourcing: From other domestic nonaffiliated production location	Inshoring: From foreign inhouse production location	Offshore insourcing: From foreign nonaffiliated production location

Note: Shaded cells also part of standard matrix in figure 1.

Source: Adapted from Van Welsum and Vickery (2005) and UNCTAD (2004).

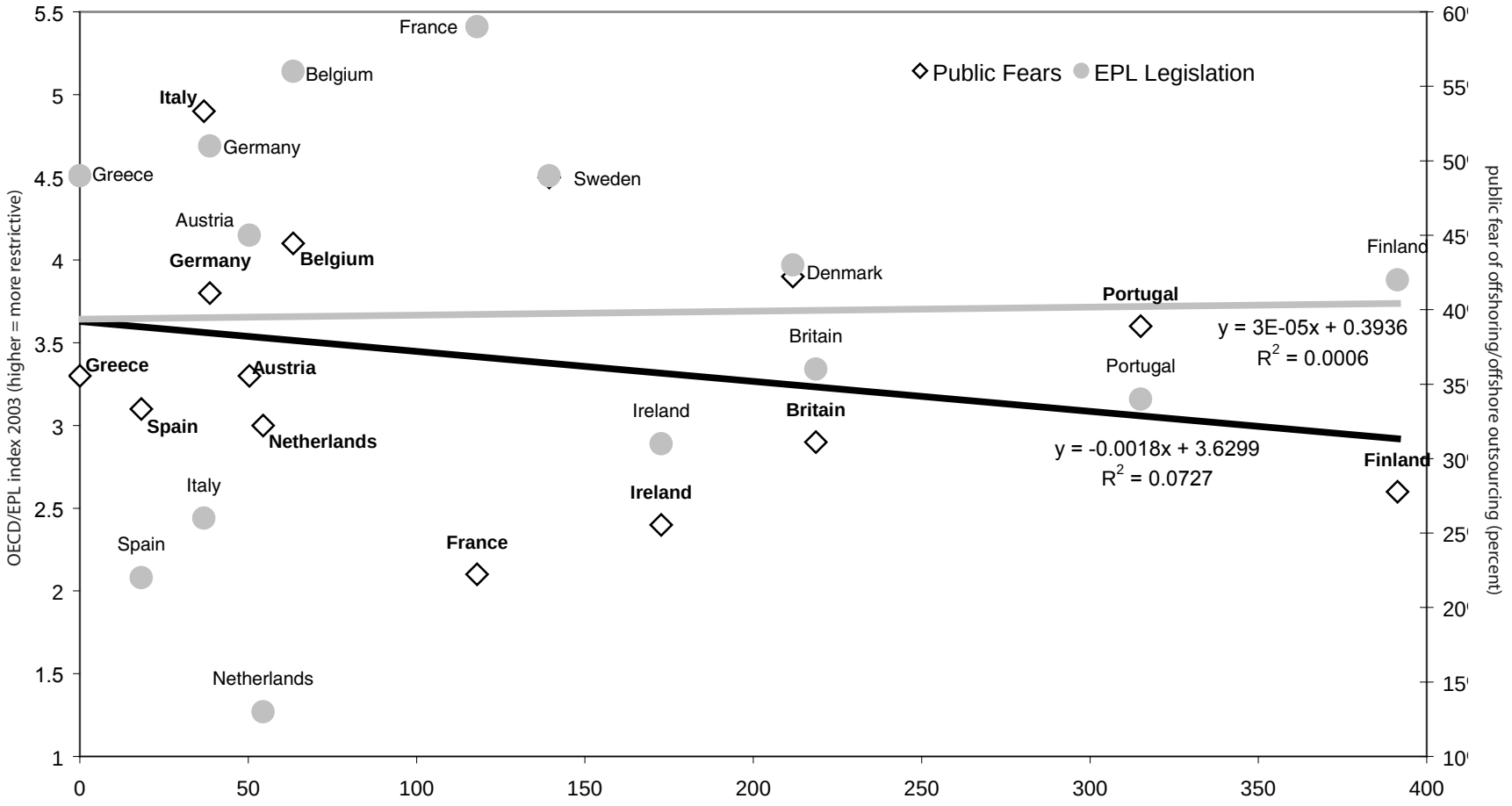
Figure 3 Offshoring/offshore outsourcing intensity, major layoffs/total private employment, 2004–05



Note: Private employment defined as total employment minus NACE category L (public administration and defense; compulsory social security).

Source: European Restructuring Monitor; Eurostat Labor Force Survey Statistics; author's calculations.

Figure 4 EU-15 intensity, public fears, and collective dismissal EPL legislation

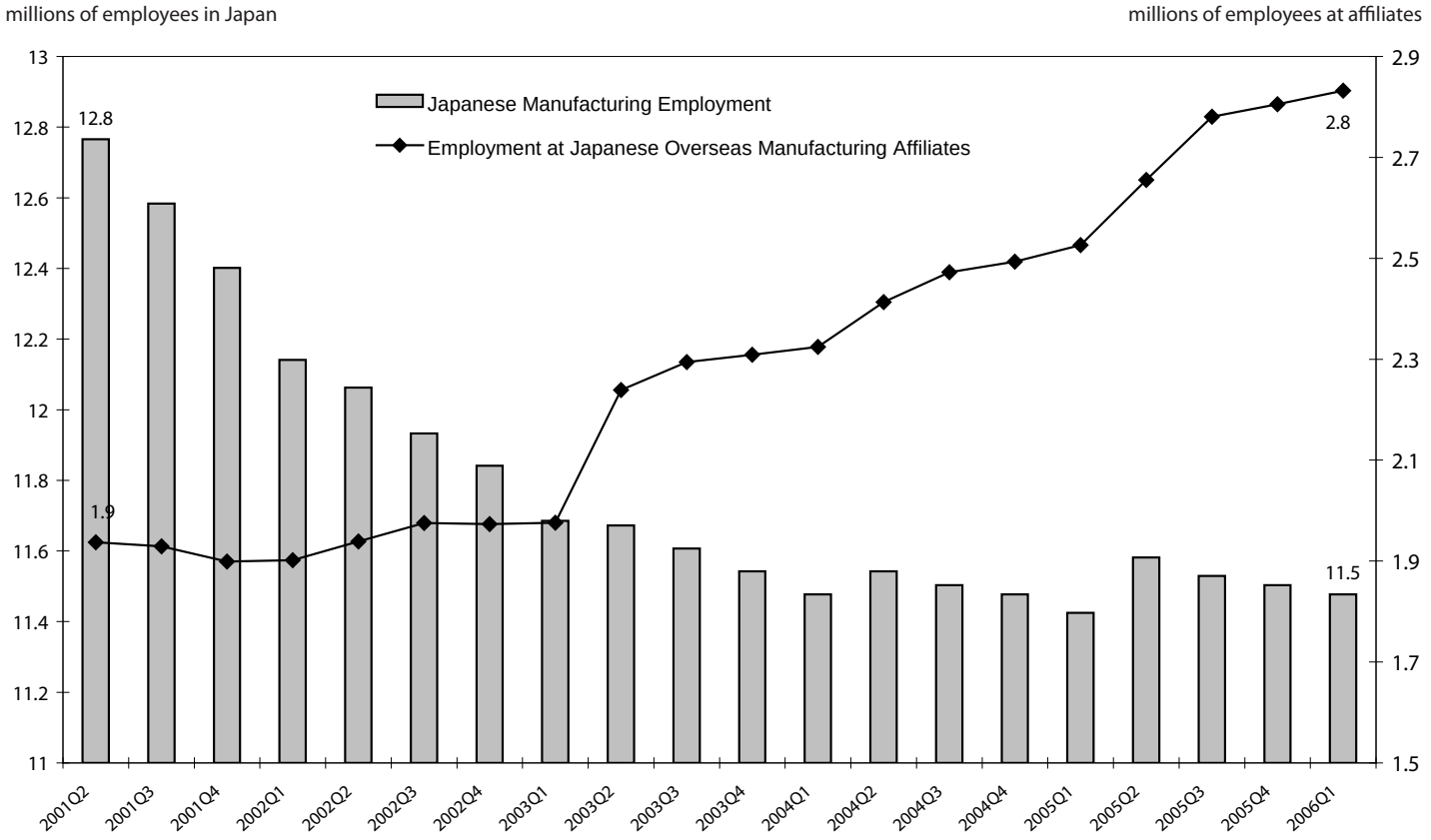


EPL = employment protection legislation

Note: Right axis shows percent of people who perceived the word "globalization" foremost linked to "delocalization of some companies to countries where labor is cheaper."

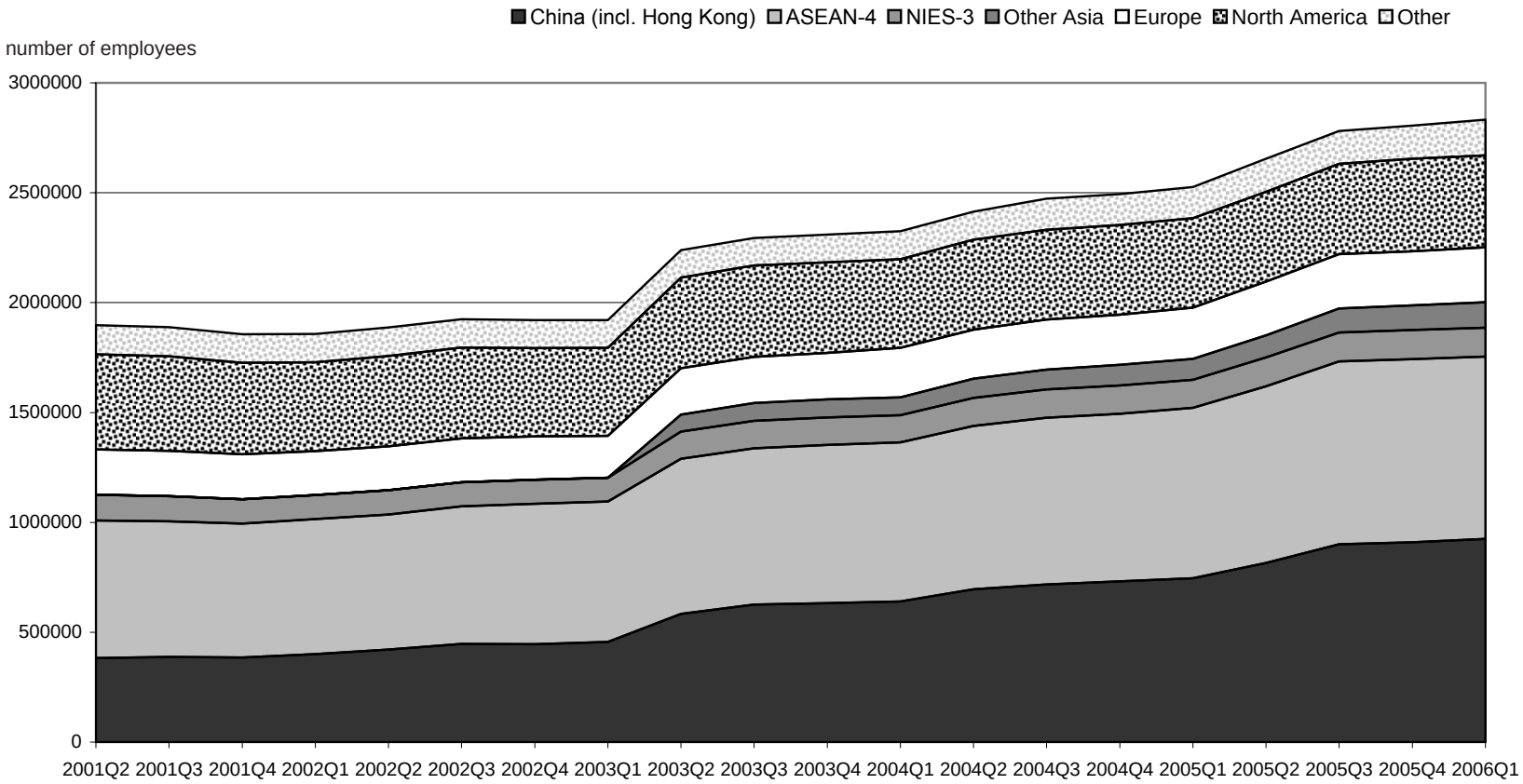
Sources: European Restructuring Monitor; European Commission (2005); OECD (2004); author's calculations.

Figure 5 Employment in Japan's manufacturing sector and at Japanese-owned manufacturing firms, 2001-06



Sources: Japanese Labor Force Survey; METI Survey of Trends in Business Activities of Japanese Foreign Affiliates; METI Quarterly Survey Since 2003 of Overseas Subsidiaries (Kaiji Chosa).

Figure 6 Japanese overseas manufacturing affiliate employment, by region

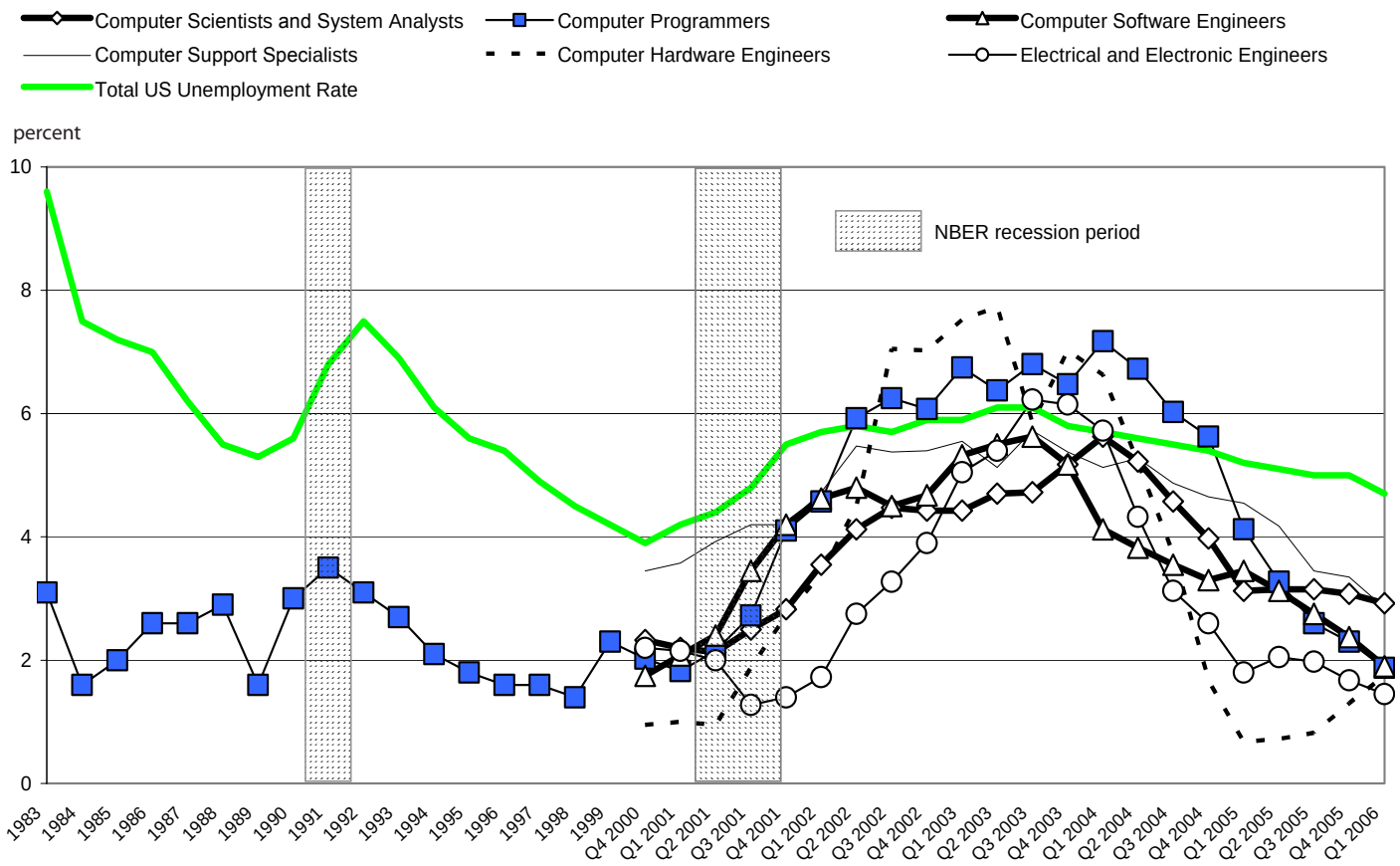


ASEAN-4 = Malaysia, Philippines, Indonesia, and Thailand
NIEs-3 = Singapore, South Korea, and Taiwan

Note: The survey methodology was altered beginning 2003.

Sources: METI Survey of Trends in Business Activities of Japanese Foreign Affiliates; METI Quarterly Survey Since 2003 of Overseas Subsidiaries (Kaiji Chosa).

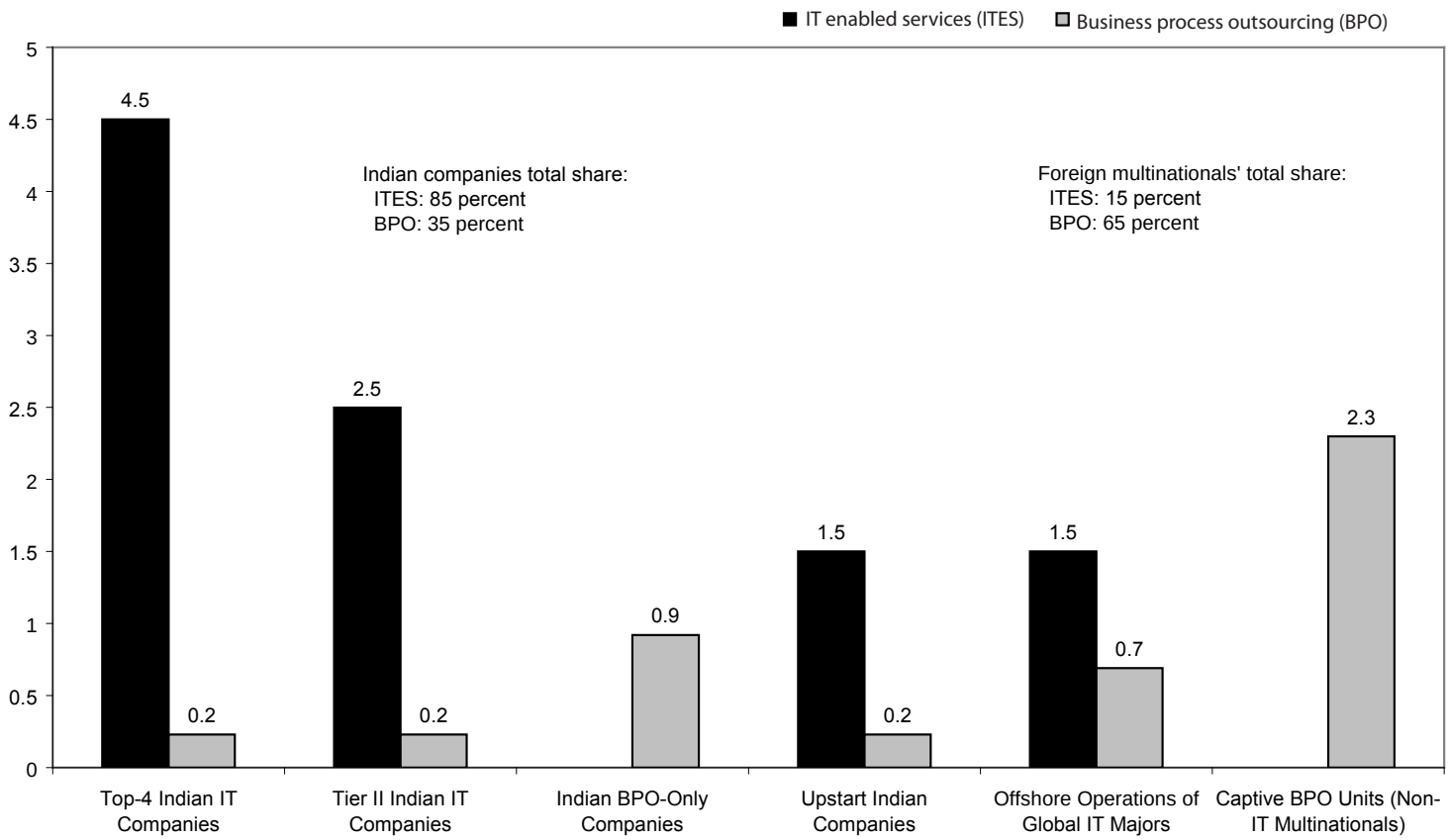
Figure 7 US total unemployment rate and select categories of IT-related occupations



Note: Annual rate from 1993 to 1999 and 4-quarter moving averages from 2000 to 2006.

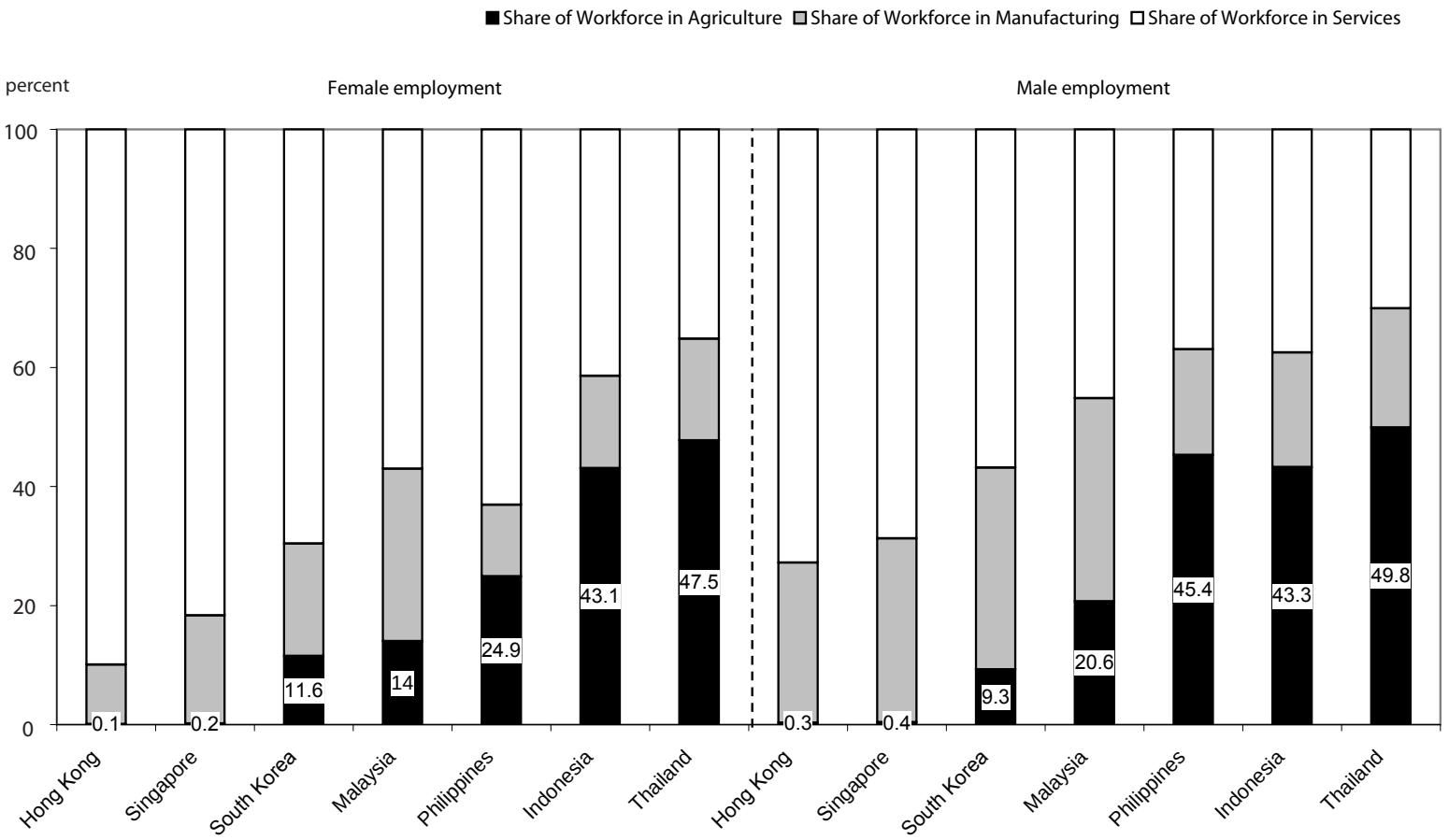
Sources: Economic Policy Institute; US Bureau of Labor Statistics.

Figure 8 India-based IT service providers, export revenue by corporate characteristics, fiscal 2005 (billions of dollars)



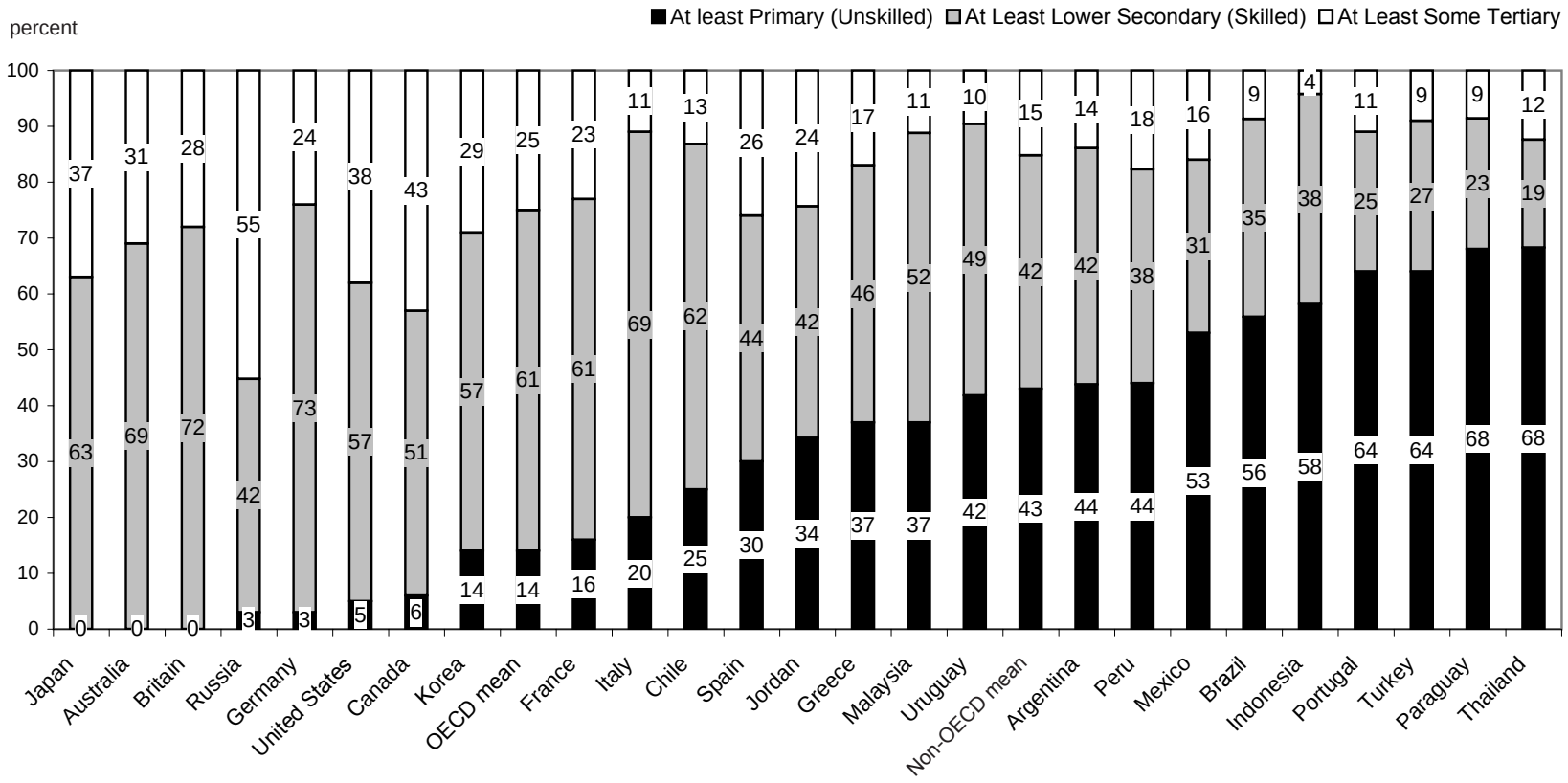
Source: NASSCOM (2006a).

Figure 9 Employment by gender and sector, 2002



Source: Asian Development Bank, *Development Indicators, 2005: Labor Markets in Asia*, available at www.adb.org.

Figure 10 Educational attainment of adult population 25–64 years of age, 2002–03



Note: For statistical purposes and its small size, the category "At least primary" is included in "Lower secondary" for Japan, Australia, and Britain.

Source: UNESCO/OECD (2005, Annex table 1.1).