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# **An Input-Output Analysis of the Philippine BPO Industry**

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Nedelyn Magtibay-Ramos, Gemma Estrada, and Jesus Felipe<sup>1</sup>

## **ABSTRACT**

This paper provides a profile of the Philippine business process outsourcing (BPO) sector; makes country comparisons with India and other BPO providers; and summarizes the results of an input-output analysis of the Philippine BPO industry's intersectoral linkages and its potential impact on compensation and employment. The Philippine BPO sector's growth is largely driven by the contact center subsector due to its large share in total BPO employment and revenues as well as government support. The input-output linkage analysis shows that the BPO industry is not a key sector in terms of stimulating production in other sectors of the Philippine economy. However, growth in the sector's revenues can have a significant impact on compensation and employment. An increase in the sector's revenues will generate a considerable increase in the sector's total wage bill and in that of the other sectors. If appropriate policies are enacted and with improvements in human capital, it is estimated that the Philippine BPO sector may become an important employment-generating sector. The sector can provide 7–11% of the new jobs for the labor force entrants between 2007 and 2010. It is also estimated that the BPO total workforce size will reach 500,000 to 600,000 in 2010, which is considerable for a single economic activity.

## **I. Introduction**

For the past 25 years, the Philippines has witnessed high unemployment amidst low to moderate growth. Unemployment stood at 4.5% in the 1970s, but increased significantly after the economic crisis of the early 1980s, and peaked during the mid-1980s (Felipe and Lanzona 2006). While economic recovery in the latter half of the 1980s led to a decline in unemployment, the poor performance of the economy in the early 1990s once again pushed the country toward double-digit unemployment rates. Since 1980, the unemployment rate has hovered between 8% and 11%. The Philippines's weak capacity to create enough jobs for its growing labor force, despite some periods of moderate growth, has led to the lingering unemployment problem.

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Over the past two decades, much of the increase in the labor force was absorbed by an expanding services sector. The share in employment of the services sector increased from 38.9% in 1990 to 48.1% in 2005. In contrast, industry's share in employment remained virtually unchanged, at around 15–16% during the same period. Analysts have blamed past economic policies carried out to pursue industrialization and growth. For several decades, the industrial sector was accorded heavy protection which inhibited backward integration, export expansion, and labor absorption (Balisacan and Hill 2003, Bautista 1983).

In the Medium-Term Philippine Development Plan (MTPDP 2004–2010), the Philippine government has openly acknowledged the need to address the country's unemployment problem and, thus, has set a target of creating about 1.5 million jobs a year between 2004 and 2010, or a total of 10 million jobs by 2010. Early indications, however, point to the government's lack of success in achieving this goal. In 2004, about 977,000 new jobs were created, but since there were 1,289,000 new entrants, an additional 312,000 were added to the already large pool of unemployed (Felipe and Lanzona 2006). Further, in 2005 only about 455,000 additional jobs were created. Although this led to a drop in the unemployed by 100,000, still total unemployment rate remained high at 11.4%.<sup>2</sup> Such inability to create enough jobs implies that the government's policy appeared to lack a cohesive strategy of addressing the unemployment issue. Recently, however, the government has ushered its support for sectors it considers as important for employment generation.

In the 2006 Workforce Development Summit, the government identified nine key employment-generating sectors to enable the matching of the country's skilled human resources with the emerging industries in the local and global markets. These are cyberservices, aviation, agribusiness, health services, mining, creative industries, hotels and restaurants, medical tourism, and overseas employment (Catiang 2006). By identifying jobs and competencies that are currently in demand, the government hopes to set up a system that works with schools and training institutions to provide the type of education that is suited for today's workplace. While this appears to be a step in the right direction, its success in substantially bringing down unemployment depends not only on the specific mechanisms that the government implements to support each of the nine sectors, but also on the capacity of each sector to generate employment for future labor entrants.

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<sup>2</sup>The unemployment rate is based on the old definition, which states that the total unemployed are 'those who did not work and were reported wanting and looking for work during the reference week.' A new definition was introduced in April 2005, which defined the unemployed as those who possess all three criteria: (i) without work; (ii) currently available for work; and (iii) seeking work, or not seeking work due to being discouraged for lack of available work, awaiting results of job application, temporary illness/disability, etc.

One of the key employment-generating sectors identified is 'cyberservices', a term that covers teleservices, e-services, information technology (IT) outsourcing, and IT- and information communications and technology (ICT)-enabled services, all of which are linked to business process outsourcing (BPO). The Philippine BPO industry measures its overall output in terms of total revenues, which consists entirely of exports.<sup>3</sup> The BPO sector is estimated to account for only 0.075% of the economy's gross domestic product (GDP) in 2000 but this increased to 2.4% in 2005. It has been hailed by the government as having huge potential for generating employment in the next five years. As of end-2005, the BPO sector employed 163,000 workers. The government and the Business Processing Association Philippines (BPA/P) have jointly forecast employment in this sector to rise by 38% annually between 2005 and 2010, employing one million workers by 2010. This forecast implies that around 27% of all new jobs in the country in 2010 would be generated by the BPO industry, which is very difficult for a single activity.

While the Philippines is already part of a large global outsourcing industry (where worldwide revenues amounted to \$67 billion in 2005), the country's capacity to benefit from this huge and expanding sector will depend on several key factors, including the quality of the existing and potential workforce, infrastructure support, and policy environment. These factors will also determine how well the country can compete against India, the leading BPO provider, and some emerging BPO providers such as People's Republic of China, Malaysia, Mexico, and Russia.

It is worth noting that nearly 70% of the BPO workers in the Philippines are in the contact center subsector. Since the minimum qualifications for employment in the contact center are a college degree, good English proficiency, and computer literacy, any college graduate can apply regardless of educational background. As a result, the contact center industry may have attracted a number of college graduates whose training is directed toward other highly skilled professions, thus creating an employment-education mismatch.

This paper aims to explore the status of the BPO industry in the Philippines, as well as to examine how the country fares vis-à-vis India and other BPO providers. It performs a quantitative analysis of the potential impact of the BPO industry on compensation, employment and output using the input-output (I-O) framework.

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<sup>3</sup> As indicated by the Business Processing Association Philippines thru communications with its Executive Director.

The rest of the paper is structured as follows. Section II briefly gives a profile of the Philippine BPO sector and gives an overview of the Indian BPO sector. Cross-country comparisons on some key elements affecting BPO growth potential are also included. Section III investigates the prospects of the BPO sector by performing an I-O analysis on the sector's intersectoral linkages, and an impact analysis on compensation and employment given the sector's expected revenue growth based on government and industry projections. Section IV explores the employment dynamics in the BPO sector with reference to the attrition rate and training requirements in order to examine if there will be a sufficient number of people to occupy the predicted number of BPO jobs. The industry's contribution to the labor force is also determined. Finally, Section V offers some conclusions. The technical appendix provides a brief summary of I-O analysis.

The analysis leads to the following main conclusions: (i) by its very low intersectoral linkages, the Philippine BPO sector has very little interaction with the rest of the economy; (ii) with a large increase in revenues, the total wage bill of the sector as well as that of the other sectors will grow significantly; and (iii) in 2010, with a workforce of around 500,000 to 600,000, the sector will provide around 11% of the jobs for new labor force entrants.

## **II. Industry Status and Its Comparison With India and Other BPO Providers<sup>4</sup>**

Offshore outsourcing enables companies in developed countries to conduct business operations through more cost-efficient means by tapping the stream of highly skilled workers in developing countries, who command wages that are far lower than those in developed countries. Even factoring other costs such as business setup and infrastructure access, cost savings through outsourcing have been estimated to be about 20–40%. A large number of contracts have been forged between large companies in developed countries and offshore suppliers in other, mostly developing, countries with the capacity to deliver low-cost outsourcing services in customer support, IT, and business processes.

In recent years, the Philippines BPO industry has vigorously grown to become one of the significant offshore providers in the Asia-Pacific Region.<sup>5</sup> As of the first quarter of 2006, at least 600 firms were considered part of the BPO industry in the Philippines. BPO services in the country are generally classified into seven subsectors, namely, contact centers, back office, data transcription, animation, software development, engineering design, and digital

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<sup>4</sup> Additional information can be found in Magtibay-Ramos et al. (2007).

<sup>5</sup> India is the leading BPO provider (NeolT 2006b). The People's Republic of China, Malaysia, Singapore, Thailand, and Viet Nam are important providers but are well below India.

content. Of these, the biggest is the contact center subsector (also known as call centers), worth US\$1.8 billion in revenues in 2005, equivalent to 75% of the total revenues generated by the entire BPO industry during the year. From about four contact centers in 2000, the number of contact centers increased to 114 as of first quarter 2006. In 2005, contact centers accounted for nearly 70% of total employment in the BPO sector. After contact centers, the next biggest BPO subsectors in terms of total revenues and employment generated in 2005 are software development and back-office operations.

Various markets are currently being served by the Philippine BPO sector. These include primarily companies in the United Kingdom and the United States, and to a lesser extent, in Australia, Canada, and France, as well as in some Asian countries such as India, People's Republic of China (PRC), Republic of Korea, and Singapore (DTI 2006).

While BPO began in the 1990s, it was only in the early part of the new millennium that outsourcing opportunities gained ground in the Philippines. Between 2000 and the first half of 2006, the cumulative amount of investment projects registered under the Philippine Board of Investment and the Philippine Economic Zone Authority reached P43.2 billion, corresponding to a total of 420 investment projects. Of this total number, 34% were investments in contact centers while 35% were investments in software development projects.

Government support for the BPO industry is quite evident. Coinciding with the surge of the BPO industry, in 2001 the government formed the Information Technology and E-Commerce Council (ITTEC) tasked to provide policy directions on information and communications technology. In 2005, the government launched the Philippine Cyberservices Corridor, an ICT belt stretching over 600 miles, capable of providing a variety of BPO services. It covers Metro Manila, Cebu, and Davao, and 15 other provinces across the country. Further, the BPA/P, a private sector organization composed of companies engaged in information-technology enabled services and BPO, openly acknowledges that the Philippine government has been very supportive in marketing the country among BPO investors, often working in close coordination with the BPA/P on a number of programs. Government support for the industry is important to help it grow continuously and take advantage of the large global BPO market.

India holds about 46% of the global market for BPO (Kaka et al. 2006). Its global dominance is mainly rooted on the reputation it has built throughout the years by delivering high-quality software services (Banerjee 2006).

One strand of the literature attributes the success of India's BPO sector on the shift in economic policy and strong government support. 1984 marked the end of the country's narrow strategy of 'technological autarchy, import substitution and export pessimism' (Schaaf 2005, 5), a catalyst that would eventually lift the country's BPO industry to where it currently stands. A primary accelerator was the formation of the Software Technology Parks of India (STPI) in 1990 that would manage IT-related infrastructure resources, provide single-window government services, and promote development and export of software services, among others (STPI2006). Another view is that the private sector has provided the initiating force in the growth of the Indian BPO sector, with the government playing almost no role (Pack and Saggi 2006). While the government was instrumental in providing good university education, such move cannot be regarded as a selective industrial policy that favored only the BPO.

A third view is that past 'policy errors' were instrumental in bringing about dramatic changes in the Indian economy (Banerjee 2006 and Kochar et al. 2006). In particular, the government's heavy investment in tertiary education led to the creation of a pool of highly-skilled (e.g. engineers), but underutilized workers. For lack of challenging projects to do, these workers took on contracts from new firms in the software industry. While initially working on a fixed price basis, Indian workers had gradually built a strong reputation, which later on shielded them from price competition. Banking on an impressive track record, the Indian software industry soon became highly competitive and dominant in the global market.

Despite India's dominance, a number of factors could dampen the sustained growth of its BPO sector. There is a risk that the country might be unable to meet the growing demand for BPO specialists owing to the low quality of education of many of its universities. Only 10–20% of graduates have the requisite training for international business. The industry also has a high level of turnover (15–30% p.a.), and employee compensation has been rising by 12–15% a year (Schaaf 2005).<sup>6</sup>

While India is recognized as the leading global outsourcing destination, in recent years it has faced looming competition from other providers, including the Philippines. However, it is unlikely that its leadership will be disputed in the next few years. Being the forerunner, India's BPO industry has gained high maturity and continues to have a large resource pool for BPO activities (Schaaf 2005). Indian firms are moving up the value chain

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<sup>6</sup> Such increase in compensation is not necessarily unfavorable if related to productivity gains.

toward knowledge process outsourcing (KPO) activities, covering services in market analysis, research, procurement, and logistics, leaving low-end BPO services to be supplied by other countries. Despite rising salaries in recent years, India's IT sector remains the most competitive: the average salary in the Indian IT outsourcing sector is the lowest among key offshore destinations (NeoIT 2006).

An important issue to examine is whether or not the Philippines could emulate India's successful model. In 2005, revenues of Philippine BPO firms were only about 14% those of India's. Moreover, while only 13% of the revenues of the Philippine BPO sector were from software and IT services, for India the corresponding percentage was 70%.

With the current status of the BPO industry, it may be some time before the Philippines could mature to a level similar to that of India for several reasons. One is that the growth of the local BPO is largely shaped by the expansion of contact centers. In the case of India, KPOs (particularly IT-related) currently capture a substantial part of the BPO business. Although software development in the Philippines has also been marked by considerable growth, its expansion has not been as fast as that of contact centers. Recent government support also appears to be based toward contact centers, given the disproportionate share of funding for training that goes to contact centers (Villafania 2006). Proficiency in English, a key requirement for contact center work, has often been highlighted as the main skill demanded by the BPO industry. But for high-value KPOs to vigorously emerge, more specialized skills in areas such as IT, science, and engineering are needed. This gives the impression that the local BPO industry is merely waiting for a 'natural process' to occur, where, at some point in time, the industry would eventually move up in the value chain ladder. It is, however, not clear how this will occur.

The expansion of the BPO industry will greatly depend on high-quality, reliable, and low-cost infrastructure services. A comparison with other offshore providers indicates some advantages and disadvantages of the Philippines. Telephone costs are lower in the Philippines than in the PRC, although higher than in India. While the Philippines has an advantage over offshore providers in South America and Eastern Europe in terms of electricity costs, it fares worse compared to its Asian counterparts. This also holds true for internet costs, which are higher in the Philippines than in PRC; India; Republic of Korea; Singapore; and Taipei, China. However, one clear advantage of the Philippines over other BPO-provider countries is its low office rental cost, which is just 32% and 40% of the rates in India and the PRC, respectively (Magtibay-Ramos et al. 2007).

The quality of human capital is a critical factor in the BPO sector. The Philippines enjoys a high literacy rate (97% in the National Capital Region; 89% in the country)<sup>7</sup> and is a popular destination among call center operators due to the fact that English is widely spoken (NeolT 2004). Compared to India, the Philippines also has a higher proportion of population in the 25–34 age group with at least tertiary education. Average salaries in the Philippine BPO sector are also lower than those of many key offshore destinations (NeolT 2006).

Government fiscal policy and quality of governance are also important in influencing the entry of investments. In terms of corporate taxation, the rate in the Philippines of 32% is comparable to those of the PRC and Thailand, and lower than that of India. However, the Philippines performs poorly in terms of governance. Out of 61 countries, the Philippines ranks only 51 in terms of transparency, and 59 or third-worst in both performance of custom's authorities and public service (Institute for Management Development 2006).

While the Philippines is comparable to or fares better than other emerging BPO providers in areas such as quality and cost of labor and certain infrastructure costs, there are problems that the country needs to address in order to be more competitive and help push the BPO sector toward sustained high growth. Based on cross-country comparisons, the most serious constraints are high electricity costs and weak governance. Industry analysts also highlight other issues related to human capital such as low hiring rates, high turn-over rates, and weaknesses in broad IT skills and English proficiency (BPA/P 2006, Clark 2006, Mapa 2006, Rodolfo 2005). If the country can effectively address these constraints and later achieve what India has gained so far, what are the implications of a large BPO sector for the country? Can it indeed play a substantial role in employment generation as well as output expansion? This issue is explored using the input-output framework.

### **III. Input- Output Analysis of the BPO Sector**

In this section and the next, we analyze the interdependence of the BPO sector with other sectors of the economy. We also investigate the prospects of the sector by examining the effects of its projected growth on the rest of the economy, and by evaluating the factors that affect personnel recruitment in the industry in order to determine if the supply of qualified individuals is sufficient.

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<sup>7</sup>Based on functional literacy level 1, which pertains to population aged 10 to 64 years who can read and write (National Statistics Office 2003).

Government and the BPO industry claim that the BPO sector is a key employment-generating sector. Particularly, they are predicting a huge increase in both the industry revenue and workforce, reaching almost US\$12.2 billion and around a million employees, respectively, by 2010.

What is the impact of such a considerable growth in the Philippine economy? How will growth in the BPO sector affect the rest of the economy? How does the BPO sector affect production in the other sectors of the economy? In this section, we propose to answer these questions using Philippine Input-Output (I-O) tables.

We use the Philippine I-O tables as a consistency framework and a tool to generate employment projections. The I-O framework is based on the assumptions of homogeneity and proportionality. Homogeneity involves three premises: (i) each sector produces a single output (i.e., products are either perfect substitutes for one another or are produced in fixed proportions); (ii) each sector has one input structure that is fixed; and (iii) there is no substitution between the products of different sectors. Proportionality implies that in any sector all inputs are used in fixed proportion so that any change in inputs will cause a corresponding change in the level of output.<sup>8</sup>

This paper uses the 2000 IO accounts of the Philippines to examine the above questions.<sup>9</sup> The IO accounts include the 240 by 240 transactions table, the technical coefficients matrix, and inverse matrix (see technical appendix for the precise definitions).

The transactions table shows the production flows within the economy during the year for each of the 240 sectors.<sup>10</sup> These flows are recorded in monetary terms. Each sector's output is distributed as a row of the table and the corresponding column gives the sector's input requirements.

The technical coefficients matrix gives the unit cost structure of production in an economy. Each coefficient is the value of input required in the production of a unit of a sector's output. The inverse or Leontief matrix gives the direct and indirect output requirement per unit of final demand in each sector.

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<sup>8</sup> These may be viewed as a set of extremely restrictive assumptions that, one way or another, invalidate, *ex ante*, the analysis. However, any model and/or statistical technique depends on assumptions. The purpose of sound economic analysis is to provide a guide for discussion. This is always better than operating in a vacuum. The I-O analysis is an excellent tool if one wants to understand intersectoral linkages, one of the main issues discussed in this paper. Also, we have designed a number of scenarios that lead to a total of six sets of estimates, ranging from the most pessimistic to the most optimistic.

<sup>9</sup> This is the latest in the series produced by the National Statistical Coordination Board in collaboration with the National Statistics Office.

<sup>10</sup> This section draws heavily from the Technical Notes of the 2000 Input-Output Accounts of the Philippines (NSCB 2006).

Using the I-O framework, this study conducts two types of analyses (i) linkages of the BPO sector on the production of the other economic sectors, and (ii) impact of changes in BPO revenues on compensation and employment.

### **A. Intersectoral Linkages**

The interrelationship of the BPO sector with the rest of the economy can be determined by looking at its linkages with the other sectors. The backward, forward, and total linkage indices are summaries that gauge the intersectoral dynamics of a sector with the other sectors as providers of input (i.e., backward linkage) and as a source of input to the other sectors (i.e., forward linkage).

The backward linkage measures the relative importance of a sector as a buyer of inputs from the other sectors. It is computed as the sum of the sector's column elements in the inverse matrix. On the other hand, the forward linkage measures the relative importance of a sector as a supplier of inputs to the other sectors and is obtained as the sum of the sector's row elements. The linkage index of a sector is the ratio of its linkage, whether backward or forward, to the average of all the sectors' linkages. The total linkage index is the sum of the backward and forward linkage indices. These measures assume an identical increase in demand by one unit for all the sectors. Since this is not likely to occur, Hansda (2003) proposes to multiply each element of the inverse matrix by the share in final demand. The resulting weighted inverse matrix is then used to calculate the linkages and the indices.

Sectors having both indices of backward and forward linkages greater than one are regarded as the key sectors of the economy. Key sectors are important in terms of investment because growth in these sectors will stimulate more production in other sectors of the economy.

In the Philippine BPO sector, the backward linkage (0.007) is greater than the forward linkage (0.0006). This indicates that the BPO sector is more a 'consumer' of inputs than a 'provider'. The I-O transactions table shows that the BPO sector requires the output of 40 other sectors in its operations, with banking, electricity, and telecommunication services as its three most important suppliers. However, the BPO sector provides services to only three other sectors: tour and travel agencies, wholesale and retail trade, and banking.<sup>11</sup>

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<sup>11</sup> For instance, the Philippine BPO sector used Pesos 76 million worth of telecommunication services as input and provided Pesos 175 million worth of its services to the banking sector in 2000.

The forward, backward, and total linkage indices for the Philippine BPO sector are 0.04, 0.45, and 0.49 respectively. These indices rank 138<sup>th</sup>, 178<sup>th</sup>, and 177<sup>th</sup>, respectively, out of 240. The low indices of the BPO sector indicate that this sector is not a very significant ‘supplier’ of inputs to other sectors nor is it an important ‘buyer’ of inputs from the other economic sectors. The low rank of the indices also indicates that the BPO sector is not a major stimulus in terms of economic interdependence.

To know which sectors of the economy have a high degree of forward or backward linkages, one can refer to Table 1, which presents the ten top ranking sectors for each type of index. The wholesale and retail trade sector tops the list for all the three indices. Obviously, this industry provides products as input to many other sectors of the economy and it also purchases a significant quantity of goods and services from the rest of the economy.

Given the low indices of backward and forward linkages of the BPO sector, it can therefore be concluded that in terms of stimulating production in other sectors of the Philippine economy, the BPO industry is not a key sector. Note that the majority of the BPO industry’s clients are companies outside the Philippines. Hence, most of its output is exported to other countries. In fact, the total final demand of the sector consists entirely of exports whose share of the sector’s total output is 92% (while the share of total intermediate demand is only 8%). Also, the processes involved in the industry do not require inputs from a large number of other sectors. The share of total intermediate inputs in total gross output is only 35% while the share of gross value-added is 65%. This is not to say that the BPO sector does not stimulate activities in the other sectors. Rather the level of inducement is not as big as that of some other sectors, like for example, that of the wholesale and retail trading. The higher than average compensation of BPO employees, as shown in the next section, may potentially increase personal consumption if this sector’s workforce has a high propensity to consume.<sup>12</sup>

**Table 1**  
**Top Ranking Sectors with respect to the Linkage Index**

<b>Rank of Index</b>	<b>Backward Linkage Index</b>	<b>Forward Linkage Index</b>	<b>Total Linkage</b>
1	Wholesale and retail trade (8.1)	Wholesale and retail trade (158.2)	Wholesale and retail trade (166.3)
2	Public administration and	Electricity (13.0)	Electricity (14.1)

<sup>12</sup> Also, the 24-hour activities in BPO firms may increase the need for transportation and food supply around the BPO locations. But these are not direct inputs to the industry. These represent personal consumption.

3	defense (5.1) Manufacture of parts and supplies for radio, TV and communication (4.8)	Banking (9.4)	Construction (12.8)
4	Manufacture of semiconductor devices (4.7)	Construction (8.1)	Banking (10.8)
5	Construction (4.7)	Petroleum refineries including liquefied petroleum gas (7.1)	Manufacture of semiconductor devices (10.5)
6	Manufacture, assembly and repair of office, computing and accounting machines (4.6)	Rice and corn milling (6.0)	Public administration and defense (9.8)
7	Manufacture, assembly, rebuilding and major alteration of railroad equipment, aircraft, and animal and hand-drawn vehicle (4.1)	Manufacture of semiconductor devices (5.8)	Rice and corn milling (8.4)
8	Ownership of dwellings (3.7)	Public administration and defense (4.7)	Manufacture of parts and supplies for radio, TV and communication (8.0)
9	Manufacture of photographic and optical instruments (3.5)	Slaughtering and meat packing (4.5)	Manufacture, assembly and repair of office, computing and accounting machines (7.5)
10	Manufacture of communication and detection equipment (3.5)	Restaurants, bars, canteens and other eating and drinking places (3.8)	Ownership of dwellings (7.4)

Source: Authors' estimates.

## B. Impact Analysis

To assess the impact of changes in the BPO sector's final demand, this paper estimates output and compensation multipliers. Simulations were performed to determine (i) the additional compensation that would result under different scenarios; and (ii) the number of new jobs that will be generated.

### 1. Output Multiplier

In undertaking the impact analysis, an important concept used is that of the output multiplier. A sector's output multiplier is the total value of production in all sectors needed for a unit's worth of final demand for the sector's output. Comparison of output multipliers for the different sectors shows where spending a particular amount of money would have a bigger effect considering the total output value brought about in the economy (Miller and Blair 1985).

The simple output multiplier is the sum of the sector's column elements in the inverse matrix. The simple output multiplier of the Philippine BPO sector is 1.63. This indicates that every dollar's worth of new final demand for the BPO sector induces a total of \$1.63 of

additional output from all the sectors of the economy. Therefore, a \$10 million worth of new final demand for the BPO sector will generate \$16.3 million of additional output from the whole economy.

## 2. Impact on Compensation

Analysis of the impact on compensation primarily involves measuring the change in total compensation for the BPO sector and the rest of the economy given additional revenue in the BPO sector. Thus, the analysis not only covers the change in compensation for the BPO sector but also on all the other sectors.

The change in compensation for each sector is obtained using the compensation coefficients from the IO technical coefficient table, the inverse matrix, and the change in BPO revenue. The change in BPO revenue is taken as the change in final demand. Computed as the sum of the sectoral changes in compensation, the compensation multiplier measures the change in compensation in the whole economy brought about by the changes in final demand.

A key figure in this impact analysis is the compensation coefficient, which is 0.31 for the BPO sector. This means that compensation accounts for 31% of the BPO sector's total inputs. Since a significant portion of the sector's inputs goes to the wage bill, a substantial increase in revenue is expected to generate a considerable amount of additional compensation.

The year 2005 is taken as the baseline. Note that between 2004 and 2005, the BPO sector obtained an increase in revenues of \$945 million (Table 2). Using the compensation multiplier, we estimated that the BPO revenue increase of \$945 million in 2005 generated an increase in compensation of \$291 million for the BPO sector and \$87 million for the other sectors. Thus, in terms of compensation, the total impact on the economy in 2005 amounted to about \$378 million. This analysis was replicated for each of the forecast years (2006 to 2010) under three different scenarios based on different revenue forecasts.<sup>13</sup>

**Table 2**

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<sup>13</sup> It has been recently reported (Domingo 2007) in an interview with the Trade and Industry Secretary that (i) BPO revenues in 2006 was \$3.63 billion and the 2010 forecast is \$12.4 billion; (ii) workforce in 2010 is projected to be 920,764 (162,036 less than the BO-CICT-BPA/P forecast in August 2006); and (iii) the number of employees in 2006 is 244,675 (21,325 less than the BO-CICT-BPA/P forecast in August 2006).

**2006 to 2010 Forecasts for the BPO Sector under Different Scenarios**

	2004	2005	2006	2007	2008	2009	2010
Workforce <sup>a</sup>	100,500	163,250	266,000	403,400	568,800	794,800	1,082,800
New jobs		62,750	102,750	137,400	165,400	226,000	288,000
<b>Revenues (\$ millions)</b>							
Baseline <sup>a</sup>	1,474	2,419	3,627	4,992	6,769	9,130	12,199
Scenario I			3083	4243	5754	7761	10369
Scenario II			2539	3494	4738	6391	8539
<b>Change in revenue</b>							
Baseline		945	1208	1365	1777	2361	3069
Scenario I			664	1160	1510	2007	2609
Scenario II			120	956	1244	1653	2148

<sup>a</sup> Board of Investment- Commission on Information and Communications Technology - Business Processing Association/Philippines (BOI-CICT-BPA/P) 2006 to 2010 forecasts. Sources: BOI-CICT-BPA/P as cited in Locsin (2006); Authors' estimates. Note: Revenues are expressed in nominal dollars.

The Board of Investment-Commission on Information and Communications Technology-Business Processing Association/Philippines (BOI-CICT-BPA/P) workforce growth projections in Table 2 are based on the following factors: (i) previous years' performance (2000–2005); (ii) investment leads in terms of companies that are likely to set up operations and their workforce requirements (based on investment missions); and (iii) industry performance, i.e., which subsectors are likely to experience growth based on trends in the world market. The revenue projections were calculated using the workforce forecasts and the prevailing rates of revenue per agent, per sector, and per year (based on surveys).<sup>14</sup>

The baseline is the BOI-CICT-BPA/P revenue forecast. This is assumed to be the best possible scenario. In scenario I, the BOI-CICT-BPA/P revenue forecast is reduced by 15%. In scenario II, the BOI-CICT-BPA/P revenue forecast is reduced by 30%. The results of the impact analysis are summarized in Table 3.

**Table 3  
Additional compensation under different scenarios (\$ millions)**

	2006	2007	2008	2009	2010
<b>Impact on BPO sector</b>					
Baseline	372	420	546	726	944
Scenario I	204	357	465	617	802

<sup>14</sup> This information was obtained through communications with BOI and BPA/P.

Scenario II	37	294	383	508	661
<b>Total impact on the other sectors of the economy</b>					
Baseline	111	126	163	217	282
Scenario I	61	107	139	185	240
Scenario II	11	88	114	152	198

Source: Authors' estimates.

These forecasts show that the BPO sector's additional revenue may be able to generate a significant increase in the total wage bill for the industry. Since we assumed the best scenario to be the BOI-CICT-BPA/P revenue forecast (Baseline), under the most optimistic assumptions the change in compensation for the sector ranges from \$372 million in 2006 to \$944 million in 2010. Under Scenario I, the additional compensation forecasts for the BPO sector are \$204 million and \$802 million for 2006 and 2010, respectively. The least optimistic scenario projects only \$37 million for 2006, but rises to \$661 million in 2010.

The impact on the rest of the economy (i.e., the other 239 sectors) is also considerable, albeit smaller than the wage bill increase in the BPO sector. For the three different scenarios, the change in compensation ranges from \$11 million to \$111 million for 2006 and \$198 million to \$282 million for 2010. The changes in compensation obtained in this exercise are used as inputs in the analysis of the impact on employment in the next subsection.

### 3. Impact on Employment

The impact of the increase in BPO revenues on employment is estimated as the ratio of the change in the sector's compensation to the average wage rate.<sup>15</sup> In 2005, the average wage or compensation for the additional BPO employees is computed by dividing the additional compensation by the number of new jobs. With 62,750 employees added to the workforce, the average yearly compensation per new employee in 2005 was \$4,631 (equivalent to an average monthly compensation of \$386 or Pesos 21,227). In comparison, the 2005 average compensation for the Philippines was equal to \$165 or Pesos 9,065 per month.<sup>16</sup> Hence, the BPO sector's average compensation in 2005 is more than double that of the Philippine average.

<sup>15</sup> For a given year, average compensation of new employees = ratio of change in total compensation to change in workforce. Since the change in compensation has been obtained (Table 3), then, given the average compensation, the additional employment can easily be estimated as  $\Delta \text{workforce} = (\Delta \text{compensation}) / \text{average compensation}$ .

<sup>16</sup> Estimated using the most recent available Bureau of Labor and Employment Statistics data.

In combination with the three scenarios previously described, two different assumptions regarding the average compensation are considered: (A) the average compensation remains at the 2005 level; and (B) the average compensation increases at an annual rate of 7%.<sup>17</sup> The additional BPO employment brought about by the increase in compensation was computed for each of the six possible scenario combinations (results are shown in Table 4).

**Table 4**  
**Results of Simulations**

<b>Number of new BPO jobs generated</b>						
<b>Scenario</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Total</b>
Baseline and A	80,214	90,639	117,997	156,775	203,788	<b>649,413</b>
I and A	44,088	77,043	100,297	133,259	173,220	<b>527,907</b>
II and A	7,962	63,447	82,598	109,743	142,652	<b>406,401</b>
Baseline and B	74,966	79,168	96,320	119,603	145,298	<b>515,355</b>
I and B	41,203	67,292	81,872	101,663	123,503	<b>415,534</b>
II and B	7,441	55,417	67,424	83,722	101,709	<b>315,713</b>
<b>BPO workforce forecast</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	
Baseline and A	243,464	334,103	452,099	608,875	812,663	
I and A	207,338	284,381	384,678	517,937	691,157	
II and A	171,212	234,659	317,256	426,999	569,651	
Baseline and B	238,216	317,384	413,704	533,307	678,605	
I and B	204,453	271,746	353,618	455,281	578,784	
II and B	170,691	226,108	293,532	377,255	478,963	
<b>Number of new jobs generated by the other 239 sectors</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Total</b>
Baseline and A	56,104	63,395	82,530	109,653	142,535	454,218
I and A	30,836	53,886	70,151	93,205	121,155	369,233
II and A	5,569	44,377	57,771	76,757	99,775	284,249
Baseline and B	52,434	55,372	67,369	83,654	101,626	360,455
I and B	28,819	47,066	57,264	71,106	86,382	290,637
II and B	5,204	38,760	47,158	58,558	71,138	220,819

Source: Authors' estimates.

Since under scenario B the average compensation is assumed to increase, for each revenue forecast scenario (Baseline, I or II), the resulting number of new jobs is always

<sup>17</sup> The annual increase of 7% was calculated from the most recent values of the average monthly compensation for computer and other related activities as given in the *2005 Philippine Industry Yearbook of Labor Statistics (BLES 2005a)*.

smaller than for scenario A. Under the latter, the BPO sector can generate a total number of new jobs between 406,401 and 649,413 between 2006 and 2010. However, this assumes no increase in the average compensation in the sector. Under the more realistic scenario B, between 315,713 and 515,355 new total jobs can be created in the same period.

With the 2005 total workforce of 163,250 as baseline, the forecast for the succeeding 5 years is given by the cumulative sum in Table 4. It is worthwhile to compare the results obtained here with the employment projection of the government and BPA/P shown in Table 2. It is apparent that the workforce forecasts obtained using the results of the I-O analysis are lower than those of the BOI-CICT-BPA/P, even under the most optimistic assumptions of no increase in average compensation, and that revenues increase by as much as the government and the industry association's forecast. The difference is particularly substantial toward the final years (2008 to 2010).

Under the BOI-CICT-BPA/P revenue forecasts and the assumption that the average compensation remains at the 2005 level, the I-O analysis predicts an increase in employment between 80,214 for 2006 and 203,788 for 2010 (Table 4). This results in a BPO workforce of 243,464 in 2006 and 812,663 in 2010, significantly below the BOI-CICT-BPA/P forecast. Under the more realistic assumption that wage rates grow, total employment in the sector by 2010 can be as high as 678,605; that is, about half of what the BOI-CICT-BPA/P forecasts.

To examine the impact of changes in BPO revenues on the employment level of the other sectors of the economy, the 2005 average monthly compensation for the Philippines of \$165 or Pesos 9,065 per month was used together with the changes in compensation for the 239 other sectors. The results for the six scenarios are given in Table 4.

These results show that an increase in BPO revenues will also generate new jobs in the other sectors. For the best scenario, almost 143,000 additional jobs will be generated in the rest of the economy in 2010. The total number of new jobs generated by the other 239 sectors of the economy between 2006 and 2010 ranges from almost 221,000, under the most conservative assumptions (II and B), to about 454,000 under the most optimistic assumptions (Baseline and A). Between 2006 and 2010, the total number of new jobs in the whole economy that will be generated by the additional BPO revenues oscillates between 536,000 and 1.1 million.<sup>18</sup>

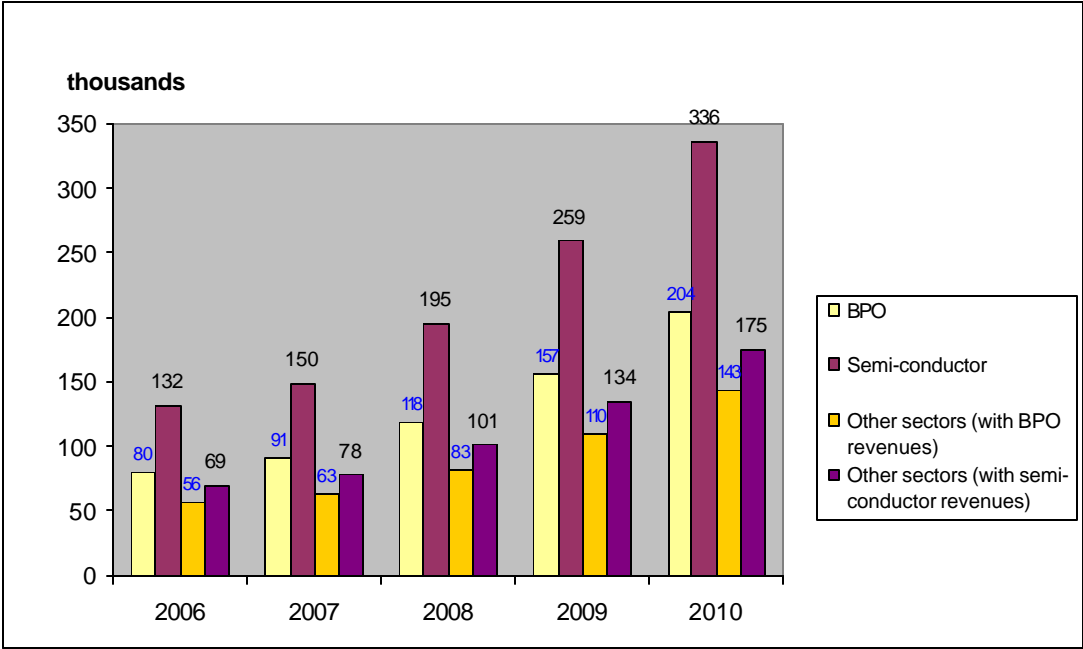
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<sup>18</sup> Computed as 220,819 (II & B in third part of Table 4) + 315,713 (II & B in first part of Table 4), and 454,218 (Baseline & A in third part of Table 4) + 649,413 (Baseline & A in first part of Table 4), respectively.

This indicates that while the BPO sector has the potential of being an important employment generator, its capacity is substantially smaller than what the sector and government have claimed.

If the same amount of additional revenue were received by another sector with high intersectoral linkages, what would be the impact on employment? Simulations under the baseline scenario and A were carried out for another sector, the manufacture of semiconductor devices. This particular sector was chosen because, like the BPO sector, is export-oriented. But unlike the BPO sector, the manufacturing of semiconductors has relatively high intersectoral linkages. Its total linkage index is 10.5, or 21 times that of the BPO sector. Further, in 2000 the share of semiconductor manufacturing in the gross total output of the economy was 3.28%, the 4<sup>th</sup> highest among the 240 sectors. However, its compensation coefficient is 0.17, about half that of the BPO sector. Simulation results are shown in Figure 1.

**Figure 1**  
**Number of New Jobs Generated Under the Baseline Scenario and A**



Source: Authors' estimates.

The results show that if the semiconductor subsector received an amount of additional revenues like that projected for the BPO sector, and compensation remained at the 2005 level (Baseline and A), it would generate 132,000 new jobs in 2006 and 336,000 in

2010, which is 65% more than the number of new BPO jobs (80,000 for 2006 and 204,000 for 2010). This gives a total of 1.07 million new jobs for the semiconductor subsector between 2006 and 2010. For the other 239 sectors, the number of new jobs that can be generated is between 69,000 in 2006 and 175,000 in 2010, around 22% higher than those generated by additional BPO revenues, or a total of 557,000 new jobs between 2006 and 2010. Hence, a total (i.e., direct plus indirect) of around 1.6 million new jobs for the whole economy can potentially be created between 2006 and 2010, half a million more than our best forecast for the BPO sector.

Using the most recently available I-O tables, we have shown through simulations that the government and the BPO industry may have overestimated their projection for the future size of the BPO workforce. Based on their revenue projection and under a more realistic scenario, our estimate for the BPO sector's total number of employees by 2010 is 500,000–600,000, significantly less than the 1.1 million workers predicted by the government and the BPO industry. Also, we have demonstrated that if the same amount of revenue predicted for the BPO sector were generated by a sector in the manufacturing industry, say the semiconductor devices manufacturers, the impact on employment would be significantly greater.

With this predicted growth in employment in the BPO sector, are there enough qualified persons to fill the job positions? What is the current state of employment in the sector? How much is the potential contribution of this sector to the labor force? These issues will be explored in the next section.

#### **IV. Employment Dynamics in the BPO Sector**

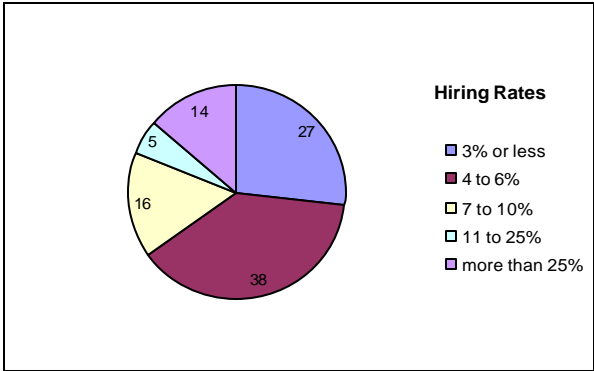
Since the number of available BPO jobs is expected to increase considerably in the next few years it is important to consider the factors that affect personnel recruitment in the industry in order to determine if the supply of qualified individuals is sufficient. Some of the elements that influence this are hiring and attrition rates, characteristics of applicants, salary, and job requirements. This issue will be explored in this section. We will assess whether the supply matches the demand for BPO employment. Some of the results in the previous section will be used to determine the required number of BPO employees in the next few years and the possible contribution of the BPO sector in providing jobs for future labor entrants.

Among the factors that affect employment dynamics are hiring and attrition rates, both company-specific measures. The hiring rate is the ratio of the number of individuals who qualify for the job and are employed by a company to the total number of applicants in a particular time interval. The attrition rate is the proportion of employees who leave the company in a given period (e.g., quarter or year).

The results of a survey on hiring and attrition rates are summarized in Figures 2 and 3. The estimate of the median hiring rate is 5%. The majority of the respondents (76%) agreed that this dearth of eligible applicants may have a negative effect on their future growth as there might be BPO positions that may not be filled up immediately.

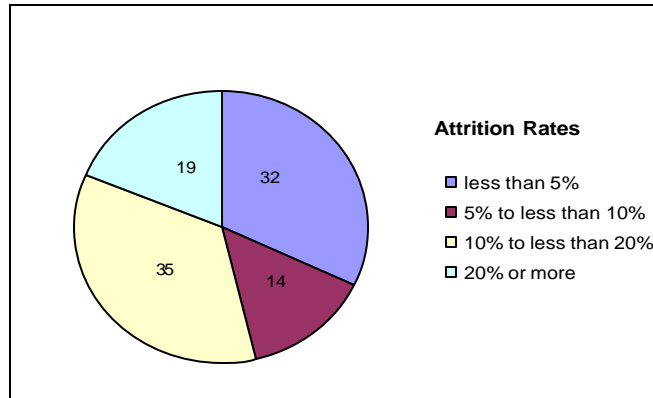
The median attrition rate is about 15%. Of the overall attrition rate, company-initiated attrition represents 15% of the total, and transfer to another firm within the industry accounts for 24%. Other major reasons include moving to another country, career shift, and pursuit of studies. **Figure 2**

**Hiring Rates, Philippine BPO Sector  
(percent of firms)**



Sources: Outsource2Philippines and BPA/P (2005).

**Figure 3  
Attrition Rates, Philippine BPO Sector  
(percent of firms)**



Sources: Outsource2Philippines and BPA/P (2005).

Attrition or loss of personnel creates positions that need to be filled up. Hence, the attrition rate affects staff requirements. Considering the median as the attrition rate for the industry, on the assumption that it remains at 15% until 2010, and that 24% of this overall attrition are transfers within the industry, the number of employees that leave the industry per year is computed using the forecast values under the different scenarios given in the previous section. Results are shown in Table 5. The resulting additional number of employees needed by the BPO industry (i.e., the number of new jobs in Table 4, plus those vacated due to attrition in Table 5) is given in Table 6. The total number of new employees required by the BPO sector is somewhere between 156,000 and 296,000 for the year 2010.

**Table 5**  
**Projected Numbers of BPO Employees Lost Due to Attrition**

Scenario	2006	2007	2008	2009	2010
Baseline and A	27,755	38,088	51,539	69,412	92,644
I and A	23,636	32,419	43,853	59,045	78,792
II and A	19,518	26,751	36,167	48,678	64,940
Baseline and B	27,157	36,182	47,162	60,797	77,361
I and B	23,308	30,979	40,312	51,902	65,981
II and B	19,459	25,776	33,463	43,007	54,602

Source: Authors' estimates.

**Table 6**  
**Projected Numbers of New Employees in the BPO Industry**

Scenario	2006	2007	2008	2009	2010
Baseline and A	107,969	128,727	169,536	226,187	296,432
I and A	67,724	109,462	144,150	192,304	252,012
II and A	27,480	90,198	118,765	158,421	207,592

Baseline and B	102,123	115,349	143,483	180,400	222,659
I and B	64,511	98,271	122,185	153,565	189,485
II and B	26,900	81,194	100,887	126,729	156,310

Source: Authors' estimates.

Hence, because of attrition, the number of new employees needed by the sector is even larger than the number of new jobs. The forecast of the Commission on Higher Education for the number of college graduates in cyberservices-inclined disciplines<sup>19</sup> is 302,914 in 2006 increasing to 350,527 in 2010 (Mapa 2006). With college graduates in cyberservices-inclined disciplines numbering at least 300,000 per year, there are potential individuals to fill the BPO positions. However, considering that not all these tertiary graduates are interested in a BPO job and that the current hiring rate is quite low due to the large proportion of unqualified applicants, the supply of qualified applicants is actually less than the demand. The absorption rate (proportion of graduates who are hired) is estimated at only 30% (Mapa 2006). In fact, the analysis of the BPO sector in the 2006 Workforce Development Summit predicts a shortfall in employees for all the BPO subsectors between 2006 and 2010.

Another significant finding of the 2006 Workforce Development Summit is that there is indeed a mismatch between labor supply and industry demand (Galang Reyes 2006). This 'job and skills mismatch' is due to the fact that most applicants do not have the skills and competencies required by the available positions. Among the qualifications that most job seekers lack are good communication and analytical skills. Particularly for the BPO industry, high proficiency in English and computer literacy are requisites for most positions. Table 7 documents the educational and training requirements. Except for entry-level jobs in animation, almost all the positions require a college education and additional training on specific areas. Thus, the educational requirement is quite high even for low knowledge-intensive jobs like customer service.

The average monthly wage rate for all nonagricultural industries skilled workers in the Philippines in 2005 is estimated to be around Pesos 11,500.<sup>20</sup> Table 7 gives the salary ranges for BPO employees. It indicates that the sector pays above-average salary. Salary

<sup>19</sup> The following disciplinary groups (classified by the Commission on Higher Education) were identified as the cyberservices-inclined disciplines by Mapa (2006): Architectural and Town Planning, Business Administration and related courses, Engineering and Technology, Fine and Applied Arts, Humanities, Law and Jurisprudence, Mass Communication and Documentation, Mathematics and Computer Science, Information Technology, Medical and allied courses, Natural Science, Social and Behavioral Science.

<sup>20</sup> Based on data from the 2005 Yearbook of Labor Statistics (BLES 2005b).

ranges of contact center positions are generally wider with a higher maximum than for other BPO subsectors. However, salaries in the BPO sector are not particularly high when compared to those of engineers, accountants, economists, or computer programmers in general, as Table 8 documents, which gives monthly wages in 2004.

**Table 7**  
**Salary Range, Educational and Training Requirements, 2006**

<b>BPO Sector</b>	<b>Position</b>	<b>Monthly salary range (Pesos '000)</b>	<b>Educational Attainment; Additional Training</b>
Contact Center	Agent	10 - 25	Majority 2–4 years college education; for technical support: ICT-related courses; English proficiency/interview skills; soft skills; product training
	Team Leader/Supervisor	20 - 35	Majority 2–4 years college education; for technical support: ICT-related courses; training: same as agent plus leadership programs
	Middle Manager	50 - 100	Majority 2-4 years college education; for technical support: ICT related courses; training: same as supervisor plus business management
Animation	Entry-level Animator	8 - 12	Preferably high school graduate; in-betweening, clean-up
	Key Animator	15 - 25	At least high school graduate; enhanced in-betweening
	TP/IB checker	10 - 12	Preferably high school graduate
	Key/BG checker	10- 12	Preferably high school graduate
	Production Assistant	8 - 12	Preferably college graduate; in-house training on process
	Digital Ink-and-Paint	8 - 12	n.a.; use of software tools
	Editor/Compositor	20 - 30	n.a.; use of software editing tools
	Assistant Director	40 - 60	n.a.; in-house on the job training with proficiency exam
	Director	60 - 100	n.a.; in-house on the job training with proficiency exam
	Production Manager	50 - 80	Preferably college degree in engineering, mass communications, business management; industry seminars on management and supervision
	Software Development	Programmer	15 - 20
Medical Transcription	Transcriptionist	10 - 12	College degree; medical transcription course
	Facilitator	10 - 15	College degree; medical transcription course
	Editor	15 - 20	College degree (preference for allied health degrees); editing courses
	Lecturer	150-450	College degree (medical degree required for medical subjects); medical transcription and editing courses
Back-Office Operations	Generic	12 - 15	Mostly college degree; internal training
	Human Resources Analyst	13 - 18	Human Resources-related college degree and other degrees such as industrial engineering; training on industry practices
	Financial Analyst	13 - 18	Business-related degree, accounting, political science, economics; internal training on specific business processes
	Engineering	18 - 25	Engineering-related college degree and also business degree; internal training on specific business processes
	ICT Operations	13 - 18	Mostly ICT- related college degree and also engineering degree; specific technical operations

Source: Mapa (2006).

**Table 8**  
**Monthly Salary, June 2004 (pesos)**

<b>Selected Occupations</b>	<b>Minimum</b>	<b>Industry</b>	<b>Maximum</b>	<b>Industry</b>
Engineers (mechanical, electronics and communications, electrical, civil, and computer engineers)	12,117	Manufacture of wood and wood products	26,811	Postal and telecommunications services
Accounting and bookkeeping clerks	7,064	Manufacture of plastic products	20,780	Postal and telecommunications services
Accountants and Editors	12,770	Retail Trade	72,803	Accounting, bookkeeping and auditing activities; tax consultancy
Statisticians	10,104	Non-bank financial intermediation	21,341	Banking institutions
Economists	13,609	Non-bank financial intermediation	21,518	Banking institutions
Computer programmers	22,038	Insurance and pension funding	23,575	Computer and related activities
Data entry operators	6,175	Computer and related activities	15,014	Accounting, bookkeeping and auditing activities; tax consultancy

Source: BLES (2007)

The 2005 Philippine labor force was estimated at 36 million and the forecast for 2010 is about 41 million (BLES 2006b). The BPO total workforce is 163,250 in 2005 and will be between 478,963 and 812,663 in 2010. Therefore, the share of the BPO industry in the labor force will increase from 0.5% in 2005 to 1–2% in 2010.

The number of new labor force entrants in 2006 is around 970,000 and will increase to 1,079,000 in 2010 based on government forecast. With the government and industry revenue forecast, the proportion of new BPO jobs over the number of new labor force entrants ranges from around 11% in 2006 to about 27% in 2010. These values are extremely high. It is not very likely that a single activity will be able to provide almost a third of the jobs for new labor force entrants. Under the more realistic conditions of a 7% annual increase in the average compensation and a reduction in the government/industry revenue forecast by 15% (scenario I and B), it is estimated that around 4% of the jobs for new labor force entrants in 2006 will be provided by the BPO sector; 7% in 2007; 8% in 2008; 10% in 2009; and 11% in 2010 (Magtibay-Ramos et al. 2007). These proportions are more reasonable than those using the industry forecast and still represent a significant share for a single economic activity.

## V. Conclusions

One important measure to address the lingering unemployment problem of the Philippines is to attract more investments in key employment-generating sectors. The government has identified the BPO sector as a critical sector that could employ as many as 1 million employees by 2010. The Philippine BPO sector is expected to experience high growth because it has been marked by a steady flow of investments, especially in the contact centers. The growth of the BPO sector will be largely influenced by the contact centers because (i) they capture 70% of total BPO employment and 75% of total BPO revenues; (ii) they have accounted for about one half of total cumulative investments in the BPO sector since 2000; and (iii) government support appears biased toward contact centers.

The implications of BPO revenue growth on output and employment expansion have been examined here through the input-output framework. Given improvements in human capital and the right policy environment, the Philippine BPO sector may indeed become an important employment-generating sector in the future. However, even under the most favorable assumptions, the total number of workers in the sector falls short of the industry's forecast. Perhaps a more reliable figure is about 500,000–600,000 workers in 2010.

As shown by the linkage analysis, the BPO sector has very little interaction with the rest of the economy. Hence, an increase in the Philippine BPO industry's output may not necessarily increase production in most of the other sectors. This is because exports account for 92% of the sector's output and intermediate demand is only 8%. Also, the BPO sector requires direct inputs from relatively few other sectors. Hence it is not a major stimulus of economic interdependence.

Notwithstanding its low intersectoral linkages, the BPO sector has the potential of generating a significant increase in the total wage bill for the economy. The IO analysis showed that growth in the BPO sector's revenues has a non-negligible impact on compensation and employment. A substantial increase in the sector's revenue will result in a significant increase in the sector's total compensation and in that of the other sectors. The reasons for this big impact on compensation are: (i) the revenue forecast, based on the industry's forecast, is a very high base; and (ii) a key figure in the simulations is the compensation coefficient, a very high 31%.

Although lower than the government's forecast, the estimate here represents a substantial portion of the number of jobs that the country needs to generate for future labor entrants. The sector can provide 7–11% of the jobs for new labor force entrants between 2007 and 2010, which is a high contribution for a single economic activity.

What challenges will the sector face in the future? The first one is whether the Philippines is going to continue attracting investments in the BPO sector, given the competition from other locations. Although the advantages of locating in the Philippines should be emphasized, constraints like low hiring rates, high attrition rates, high cost of electricity and weak governance, must be addressed without delay.

Second, is the question of how the sector is going to move up the knowledge intensity ladder. There are government and industry pronouncements emphasizing the desire to advance toward higher-end knowledge process outsourcing but no specific strategy to achieve this goal has been laid out.

A third and related issue is whether the sector will continue to require government support. Various government agencies are already mobilized to encourage the development of the sector. What other type of assistance can be made available to facilitate the growth of the sector? If the government is seriously bent on moving toward knowledge process outsourcing, then it is important to identify strategies to entice more investors that are involved in knowledge process outsourcing, as well as to encourage BPO firms to move into higher-value added activities. The latter is linked to a proper understanding of the needs of the industry in order to grow. Surely, the industry needs a greater pool of workers with specialized skills beyond high English proficiency.

Fourth and final, since the existence of a pool of educated workers with tertiary education is seen as a key to the development of the sector, an analysis of the state of tertiary education in the Philippines is required. The following two questions, in particular, must be answered: (i) is it optimal for the Philippines to continue investing in tertiary education to satisfy the needs of the BPO sector?; and (ii) are students (or the educational system in general) who take degrees in disciplines such as engineering, statistics, economics, etc. to be blamed for their lack of appropriate skills (e.g. communication skills) to be employed in the BPO sector?

## TECHNICAL APPENDIX

### Input- Output Analysis<sup>21</sup>

The input-output (I-O) model is used to examine the interdependence of the different sectors in an economy.

An I-O model is created from actual data for a specific economic zone (e.g., a country, region, province, etc). The data consists of flows of products from each sector or activity, considered as a producer, to each of the sectors considered as consumers. These flows, usually in monetary terms, are calculated over a certain time period (e.g., annually) and are arranged in a transactions table. The rows of this table give the allocation of a sector's output over the economy and the columns indicate the allotment of inputs required by a particular sector to produce its output.

Also, there are consumers who are external to the sectors that comprise the producers in the economy (e.g., governments, households, and foreign trade). The demands of these exogenous consumers are referred to as final demand. These are included in the transactions table as columns to the right of the endogenous sectors. Furthermore, a sector pays for other items, like labor and capital, and uses other inputs such as inventoried items. These are called value added in sector  $i$  and are incorporated as additional rows in the transactions table.

An I-O system then consists of a set of  $n$  linear equations with  $n$  unknowns. Let  $z_{ij}$  be the value of the flow from sector  $i$  to sector  $j$ ,  $X_i$  the total output of sector  $i$ , and  $Y_i$  the total final demand for sector  $i$ 's product. Then

$$X_i = z_{i1} + z_{i2} + \dots + z_{in} + Y_i \quad \text{for } i = 1, \dots, n.$$

The ratio of input to output is called the **technical coefficient**, denoted by  $a_{ij}$ , and is defined as

$$a_{ij} = \frac{z_{ij}}{X_j}.$$

These coefficients are assumed to be fixed.

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<sup>21</sup> This makes heavy reference to Miller and Blair (1985).

In matrix notation, the basic I-O relation can be presented as:

$$X = AX + Y$$

where  $X = (x_1, \dots, x_n)'$  is the vector of gross output

$A = (a_{ij})$  is the matrix of technical coefficients

and  $Y = (y_1, \dots, y_n)'$  is the vector of final demand

$AX$  is the intermediate demand. Hence, the gross output is the sum of the intermediate demand and the final demand.

From the above equation,

$$X = (I - A)^{-1}Y$$

where  $I - A$ , called the Leontief matrix, is non-singular and  $I$  is the identity matrix.

The matrix  $(I - A)^{-1}$  is called the **Leontief inverse** and gives the direct and indirect sectoral output requirements to support one unit of final demand in each sector. Let  $a_{ij}$  represent the elements of the Leontief inverse.

### Impact Analysis

The I-O model is utilized to evaluate the effect of changes in exogenous elements on an economy. The assessment is often called *impact analysis* if the changes arise due to only one exogenous element or a few such elements, and if the changes are projected to happen in the short run (say, in a year).

There are several measures, called I-O multipliers, which are frequently used in impact analysis. These multipliers utilize the Leontief inverse  $(I - A)^{-1}$ .

### Output Multipliers

An output multiplier for sector  $j$  is the total value of production in all sectors that is needed for a unit's worth of final demand for the output of sector  $j$ .

Let the changes in final demand and gross outputs be denoted by  $\Delta Y$  and  $\Delta X$ , respectively. Then,

$$\Delta X = (I - A)^{-1} \Delta Y.$$

The elements of  $\Delta X$  are the values of the required additional output from each of the sectors in the economy. These can be considered as determinants of the impact on the economy of the new final demand.

For a change in sector  $j$  only,

$$\Delta X(j) = (I - A)^{-1} \Delta Y(j)$$

where  $\Delta Y(j)$  is a vector consisting of zeros except for the  $j$ th element that gives the change in final demand for sector  $j$ .

Each element of vector  $\Delta X(j)$ , say  $\Delta X_i$ , gives the additional output from each sector  $i$  that is necessary for the new final demand for the output of sector  $j$ .

The **output multiplier** for sector  $j$  is the sum of the elements of the vector  $\Delta X(j)$ .

If  $\Delta Y(j)$  is such that its  $j$ th element is 1, then  $\Delta X(j)$  is just the  $j$ th column of the Leontief inverse and it gives the additional output of each sector, say in dollars worth, needed for a unit (a dollar) of new final demand for sector  $j$ 's output. Hence, the **simple output multiplier** for sector  $j$  is given by  $\sum_{i=1}^n a_{ij}$  which is the sum of the  $j$ th column of the Leontief inverse.

### Compensation Multiplier

The ratio of compensation over total output can be considered as a compensation coefficient that gives the output requirement in terms of amount of compensation (say in dollars) per unit (dollar) of the sector's output.

Denote the compensation coefficients as  $c_1, c_2, \dots, c_n$ . Let  $C$  be the diagonal matrix whose diagonal elements are the compensation coefficients  $c_1, c_2, \dots, c_n$  and  $C$  be the vector of compensation for the sectors. The change in compensation in each sector arising from changes in the exogenous final demand is given by

$$\Delta C = C \Delta X = C(I - A)^{-1} \Delta Y.$$

The sum of the elements of  $\Delta C$  is the **compensation multiplier** that measures the change in compensation in all the economic sectors brought about by the changes in final demand.

### Intersectoral Linkages<sup>22</sup>

The most commonly used measures of intersectoral dependence are the **backward, forward, and total linkage indices**. Backward linkage of a sector determines the amount of inducement on production in all sectors of inputs needed by the sector. Forward linkage of a sector reflects the extent to which the sector's output is used by other sectors as input.

The sum of the elements in the  $i$ th row of the Leontief inverse is usually taken as the measure of forward linkage. This assumes an identical increase in demand by one unit for all the sectors that is not likely to occur in reality. To resolve this, the Leontief matrix is weighted by the share in final demand. Hence, each element of the Leontief matrix, say  $a_{ij}$ , is weighted to calculate

$$a_{ij}^w = a_{ij} f_j / \sum_{j=1}^n f_j$$

which is the element of the **final demand weighted Leontief inverse**.

The **forward linkage** is then  $a_{i.}^w = \sum_{j=1}^n a_{ij}^w$ , the sum of the elements in the  $i$ th row of the final demand weighted Leontief inverse. This gives the increase in output of the  $i$ th sector used as inputs for producing an additional unit of final demand output, given each sector's share in total final demand.

The intersector comparison of forward linkages can be made by constructing an **index of forward linkage** defined as

$$U_i^w = \frac{a_{i.}^w / n}{\sum_{i=1}^N a_{i.}^w / n^2}$$

<sup>22</sup> This section draws heavily from Hansda (2003).

Accordingly, an **index of the backward linkage** is given by

$$U_{.j}^w = \frac{\mathbf{a}_{.j}^w / n}{\sum_{j=1}^N \mathbf{a}_{.j}^w / n^2}$$

where the **backward linkage** is defined by  $\mathbf{a}_{.j}^w = \sum_{i=1}^n \mathbf{a}_{ij}^w$ , the sum of the elements in the  $j$ th column that gives the input requirements for a unit increase in the final demand for output of the  $j$ th sector given each sector's share in total final demand. The sum of the backward and forward linkage indices is the **total linkage index**.

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