Assessing the Economic Contribution of Sin Industries to the Philippine Economy: The Dilemma between Macroeconomic Growth and Microeconomic Welfare

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Abstract

One of the major contributory factors to the economic expansion of the Philippines can be attributed to the increase in the multiplier effect of the industrial sector, one of which is the "sin" industries, which comprise of the alcohol, liquors, wine, cigarette, tobacco, and other related industries. The increase in growth of these industries in the Philippines can be attributed to the continuous patronage of Filipinos towards these products indicating a persistent demand for vices that provides incentives for producers to increase their production. As a consequence, the industry expands, its growth diffuses to its backward linkages as well as the aggregate economy. However, with the recent economic deceleration, there is a high likelihood of lower consumption of alcohol and cigarettes as the income of consumers are expected to contract. On the other hand, another possibility may occur wherein consumers may indulge on vices during an economic downturn as an outlet for the difficulties encountered during this period. As such, the behavior of the sin industries is subject to the abovementioned scenarios. Given this backdrop, this study exposited the behavior of the sin industries in the Philippines, its contribution to the macroeconomy, and the behavior of Filipinos towards the consumption of sin products namely cigarettes, tobacco, and alcoholic beverages. Moreover, using an Input-Output (I-O) analysis, the economic contribution and magnitude of implication of the sin industries to its linkages, other related industries, and the aggregate economy can be determined and assessed. As a result, the pros and cons of developing or regulating these sin industries will be emphasized and its consequences on the consumption pattern of Filipinos can be assessed. The positive contribution of the sin industries to other industries and the macroeconomy imposes certain dilemmas whether to enhance or regulate the industries due to the harms that it entails on its end-users.

Keywords: alcohol, linkages, impact multipliers, input-output analysis, sin industries, tobacco

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I. Introduction

The world economy has been consistently experiencing booms and bust as a consequence of business cycles. These fluctuations in the performances of various economies, as been emphasized already by a significant number of literatures, affect the contribution of industries to the performance of other industries as well as the aggregate economy. On the other hand, there are industries that prosper in the harsh conditions of a recession even though all other industries struggle to make ends meet. One of the industries that are considered recession-proof is the sin industry; however, it must be noted that not all sectors of the sin industries thrive during recession (Beattie, 2009). Such counterintuitive argument comes from the fact that people are more condescending on the sin industry during a recession because the desire for comforts, such as a bottle of alcohol and/or a pack of cigarettes, is still present but it is just scaled down. These items that provide relief to people help restrain the general malaise that comes with being frugal in times of recession (Beattie, 2009). As such, specifically in the Philippines, this study will explore on the role of the sin industry in the country's aggregate economic performance. Specifically, this study will look into the tobacco and cigarette as well as the liquors and beverages industries.

The tobacco and cigarette industry is of particular interest in this study because according to Balane (2009), the industry contributed an average of PHP 25 billion to government capital every year. Meanwhile, as reported by the National Tobacco Administration (NTA), from 2003 to 2008, taxes collected from the industry ranged from PHP 23 billion to PHP 27 billion despite the occurrence of the Global Financial Crisis (GFC) in 2008. Note that these tax revenues include excise tax, corporate taxes, value-added tax (VAT), duties, and inspection fees, of which, 70 percent were sourced from excise tax as reported by the NTA. Likewise, the revenues generated from tobacco, in 2008, accounted for 1.3 percent of the Philippine Gross Domestic Product (GDP). Meanwhile, major cigarette producers, such as the *Fortune Tobacco Corporation* (FTC) and *Philip Morris Philippines* (PMP), were even listed as the biggest corporate taxpayers in the country. Specifically, FTC, who is the owner of cigarette brands *Fortune*, *Hope*, and *Champion*, paid PHP 13.27 billion in taxes in 2003. Furthermore, PMP, who is the maker of top-selling brand *Marlboro*, remitted PHP 8.36 billion taxes in the same year. In addition, as per the reports of NTA as cited by Balane (2009), aside from the massive taxes being remitted by the industry to the government, the Philippine tobacco industry is a source of livelihood to about 57,398 farmers and 300,000 members of their families as well as around 1.56 million other industry workers and dependents.

On the other hand, the liquors and beverages industry is also of particular interest in this study because it is deemed to be a complement of the tobacco and cigarette industry. Moreover, the alcoholic beverage industry has been established in the Philippines since the Spanish era. Likewise, as reported by Valbuena (2006), the Filipino consumption of alcohol specifically wine increases by 10 percent annually that in 1995, Filipinos were considered to be the top drinkers of wine in Asia consuming a total of 146,000 bottles. Furthermore, according to Valbuena (2006), since 1999, the Philippines' largest beer company – the San Miguel Brewery (SMB) sold USD 776 million worth of beer which propelled them to be the 9th of the Philippine's Top Corporation of 1999. Hence, the alcoholic beverage industry has been one of the most profitable industries in the Philippines regardless of the business cycle that in the contemporary period, domestic

manufacturers play a dominant role in the industrial sector of the country and occupy the top five positions in the Philippine alcoholic industry with SMB being the market leader with a 77 percent market share followed by *Asia Brewery*, *Tanduay Distillers*, and *Emperador Distillers* (Lewis, 2010). These local players have an advantage of a low excise tax along with enhanced efficiency in the distribution of their products. According to Tugas (2009), in nominal terms, beverage sales amounted to approximately USD 1 billion or 25 percent of the Philippine food, beverage, and tobacco (FBT) industry value.

Thus, given these backdrops regarding the tobacco and beverages industries in the Philippines, it is imperative to explore and assess the role of these industries in the country's macroeconomy, its role in their respective backward and forward linkages, and its significance to its end-users. Hence, this study has the following research objectives:

- To exposit the position of the sin industries in the Philippines, its contribution to the macroeconomy, and the behavior of Filipinos towards the consumption of sin products;
- To measure and assess the economic contribution and magnitude of implication of the sin industries to its linkages, other related industries, and the aggregate economy using an Input-Output (I-O) analysis; and
- To provide a perspective on how the sin industry can be developed to harness its positive contribution to economic agents; to regulate the externalities that it generates; and mitigate its negative consequences.

Addressing these research objectives will be important to policymakers and other stakeholders on how to maximize the economic benefits from the existence of these industries and how to minimize the negative externalities that it generates. It will also provide a point of view on how to position these industries with respect to other related industries by emphasizing on the relative importance of the sin industries in the economic growth of the country.

II. The Role of Sin Industries in the Philippine Economy

2.1. The Philippine Tobacco and Cigarette Industry

The idea of sin industries doing well during economic downturns as exemplified by Beattie (2009) goes beyond the usual behavior of industries because the goods produced by the segment of this sector of the economy are helpful in dealing with the malaise that arises from an unexpected economic downturn. That is, despite the occurrence of an economic slowdown, there are still local industries, namely the tobacco and cigarette industries, in the country that contribute positively to aggregate output growth.

The origins of the Philippine tobacco industry have been dated back to the Spanish colonial period wherein the government explored the cultivation of tobacco in their jurisdictions. Tobacco was primarily sourced from the Manila-Acapulco galleon trade, which was considered to be one of the major tradable commodities during the said period. In more recent periods, the tobacco industry in the country in 1995 was considered to be the strongest tobacco lobby in Asia as per the reports of Chapman & Alechnowiz (2004). Despite the highly plausible health degradation of tobacco consumption, a large proportion of Filipinos still consume this hazardous product. According to the 2009 report of Philip Morris Incorporated, statistics have shown that

35 percent of adults smoke tobacco; 57 percent of which are males and 12 percent are females. Moreover, 40 percent of adults are daily smokers averaging 13 cigarettes per day. Among the youth, 27 percent currently consume tobacco products wherein 34.4 percent are male and 19.6 are female. Likewise, 56 percent of the youth buy tobacco products and 64 of them were not refused purchase.

Meanwhile, the data from the Philippine government as reported by Balane (2009) revealed that from 2000 to 2002, excise tax from tobacco products amounted to PHP 18.9 billion per year. Moreover, it was estimated that health and economic costs to the population amounted to PHP 46 billion per year, which is more than twice of the excise tax collected. Subsequently, from 2003 to 2006, health and economic costs increased more than six times the excise tax generated. According to the World Health Organization (WHO) as cited by Balane (2009), government revenues amounted to PHP 23.26 billion yearly; however, health and economic costs surged to PHP 148.5 billion. Unfortunately, no statistical figures are available for the succeeding years but given the pattern observed in the previous years, it can be highly inferred that the gap is steadily increasing. In addition, this gap could have increased to PHP 445.5 billion in both 2007 and 2008, which is 17 times the PHP 25.8 billion per annum excise tax collection of the aforementioned years (Balane, 2009).

Despite the abovementioned costs, the tobacco industry, as reported by Balane (2009), propelled an average of PHP 25 billion to government capital per year. The NTA reported a PHP 25.3 to PHP 26 billion tobacco tax revenues, which includes excise tax, corporate taxes, value-added tax, duties, and inspection fees and 70 percent sourced from excise tax, from 2000 to 2002. Meanwhile, from 2003 to 2008, total tax revenue ranged from PHP 23 billion to PHP 27 billion comprising of 1.3 percent of the Philippine GDP. Additionally, as per the report in The Philippine Star (2009), the tobacco industry is on its second straight bullish year in 2009 due to plentiful harvest and good pricing. According to the Philippine Association of Tobacco-based Cooperatives (PATCO), the good performance of the industry can be attributed to a good quality of leaf being sold for PHP 80.00 pesos per kilo as compared to PHP 61.00 per kilo in 2008. Meanwhile, the NTA reported an increase in the number of farmers who planted the latter leaf in Northern Luzon wherein 2,525 hectares of land in Ilocos were planted with tobacco in 2009 as compared to 1,691 hectares in 2008. This was accompanied by an increase in tobacco farmers from 2,778 to 3,530 for the period covered.

On the other hand, the Philippine tobacco industry has contested allegations and misconceptions that the industry is on a decline despite the intervention of international organizations such as the World Health Organization Framework Convention on Tobacco Control (WHO-FCTC). According to a forecast made by the NTA, the industry averaged a 20 percent growth for the past eight years. Throughout 2009, production levels were recorded at 58.571 million kilograms but the subsequent harvest season exhibited a massive 26 percent growth amounting to 75.756 million kilogram

Production in 2010 amounted to 74 million kilograms which increased to 77 million kilograms in 2011. This is expected to increase to 80 million kilograms in 2012. From the tobacco production from 2010 to 2011, 43 million kilograms were Virginia Tobacco valued at PHP 3.096 billion; 20 million kilos of burley valued at PHP 1.36 billion; and 14 million kilos of

native tobacco valued at PHP 588 million. As a result, tobacco farmers were able to contribute PHP 34 billion to government revenue, which is approximately 4 percent of the tax collection of the Bureau of Internal Revenue (BIR). Additionally, there is a surplus demand for tobacco and tobacco products in the world market, and the local demand also continues to increase because of the high quality tobacco leaves the country produces. According to Zaragoza (2011), Philip Morris Philippine Manufacturing Incorporated (PMPMI) and Universal Leaf, which is the world's largest cigarette and tobacco manufacturer, supported the forecast and claim of NTA.

In the effort to exploit the worldwide surplus for tobacco and tobacco products, major cigarette manufacturers such as PMPMI have already extended their assistance to tobacco farmers by helping them expand their tobacco farmland with the intention of increasing tobacco production and improving their livelihood (Zaragoza, 2011). It is likely that the industry will experience continuous growth due to the interminable assistance of cigarette manufacturers. As such, according to the report of The Philippine Star (2009), these tobacco farmers in the Philippines are expected to improve the quality and quantity of their crop.

The significant contribution of the tobacco industry to stimulate the Philippine economy comes with a trade-off. Balane (2009), Dorotheo (2010), and Esguerra & Villanueva (2011) have a convergent exposition. The apparent health consequences of tobacco consumption pose a social dilemma because smoking has been linked to preventable diseases identified by the Department of Health (DOH). These diseases are pulmonary in nature such as lung cancer and chronic obstructive pulmonary diseases (COPD) which are considered to be among the leading causes of deaths in the country. Other diseases related to tobacco consumption are coronary heart disease, stroke, and cancer of the larynx, lips, or nose. That is, the nation would lose PHP 46 billion per year due to smoking related diseases, wherein PHP 27 billion is associated with treatment, PHP1 billion in lost wages, and PHP 18 billion in productivity losses due to premature deaths. Furthermore, a study by the reported that in 2003, the health and economic costs tripled to an average of PHP 148.5 billion. These statistical figures translated to 240 deaths on a daily basis and 90,000 deaths per year. Hence, there is an imbalance on economic gains versus losses from the tobacco industry.

Nonetheless, due to the continuous bullish performance of the tobacco industry, it provides livelihood to tobacco farmers and their families. Specifically, as reported by Balane (2009), it is able to provide livelihood to 57,398 farmers and 300,000 of their family members as well as around 1.56 million industry workers and their respective dependents. Moreover, in line with Corporate Social Responsibility (CSR), the PMPMI was able to donate USD 1.5 million to charity groups last 2008; 60 percent of which was geared towards providing services and health care to children with cleft palates. Despite this, the Philippines has been receiving a number of domestic and international attention on the negative externalities generated by tobacco products. In 1993 and 2005, the Philippines amended tax rates for tobacco products. However, the continuous discrepancy between tobacco tax revenues as well as health and economic cost pressured the government to address the imbalance. As such, the Republic Act (RA) 9211, also known as the Tobacco Regulation Act of 2003 was enacted whose thrust is to protect the population from the harm tobacco products cause with the purpose of promoting general welfare and to protect the interest of the workers and tobacco stakeholders. However, some provisions of this law are for the benefit of cigarette manufacturers. As cited by Valmero (2009), this law was

hurriedly passed when the members of the WHO was about to pass the international treaty. Meanwhile, according to Manongdo (2011), in 2005, the WHO-FCTC established a treaty with the Philippines and 173 other countries to address the plausible tobacco epidemic that included provisions such as graphic warnings of at least 50 percent or no less than 30 percent of the principal display panels by September 2008 but cigarette manufacturers remain uncooperative. According to Valmera (2009) and Esguerra & Villanueva (2011), this treaty was a source of controversy since government agencies have been exerting their resources in implementing FCTC measures but government agencies in the Philippines such as the Metropolitan Development Authority (MMDA) have received 9 cases against them. Cigarette manufacturers claim that the Tobacco Regulation Act of 2003 preceded the WHO-FCTC treaty while lawmakers delayed the passage of two graphic health warning in accordance with the FCTC.

Nonetheless, the Tobacco Regulation Act of 2003 is deemed to restrain the execution of tobacco control measures of the WHO – FCTC. In addition, according to Balane (2009), the Department of Finance (DOF) yearn for increasing tax rates per year using a relevant price index but fixed taxes are mandated by law; and has to persuade the Congress to re-examine the tax bill with the hopes of amending tax rates in accordance to an annual relevant price index.

2.2. The Philippine Alcoholic Beverages Industry

Just like the tobacco and cigarette industry, the alcoholic beverage industry also plays a significant role in the Philippine economy as it is considered to be one of the most profitable industries in the Philippines with San Miguel Brewery (SMB) as the country's largest beer company reporting sales of USD 776 million dollars in 1999 placing the company as the 9th top corporation in the country for the said year (Valbuena, 2006). Likewise, according to Lewis (2010), this industry plays a significant role in emerging Asian economies such as India, China, Vietnam, and the Philippines whose alcohol consumption far exceeded that of developed markets.

As reported by Euromonitor International [EI] (2012c), the Philippine alcoholic drinks had a stable volume sales performance for the year 2011 as domestic companies were the main facilitator of growth as their products remained highly demanded by Filipinos due to their affordability, established quality, and continuous strengthening of awareness for home-grown labels. In addition, according to EI (2012c), the Philippines has a huge potential on alcohol consumption because the country has a relatively low median age. The stable sales of alcoholic beverages can also be attributed to the launching of new products and high investment on celebrity endorsements both local and foreign personalities aimed to change the perception of Filipinos that local brands are not at par with international counterparts. Likewise, as highlighted by EI (2012c), craft beer and wine importers also play a major role in inducing growth in the alcoholic beverage industry wherein companies such as *Global Beer Exchange Incorporated*, *Barcino Retail Corporation*, and *Wine Exchange Corporation* engaged in partnership with mid-level and fine dining restaurants, food pairing events, wine tasting sessions that contributed to a stable increase in the volume of wine sales in 2011. In addition, as reported by Business Monitor International [BMI] (2011) and BMI (2012), the future outlook for the alcoholic beverage industry in the Philippines is lucrative. With the stable growth of the alcoholic beverage industry, alcoholic drink value sales are expected to outperform volume sales growth to 2015. The

possession of significant market power by local manufacturers accompanied by their effective strategies and efforts are expected to significantly contribute to the future expansion of the alcoholic beverage industry. Lastly, local players benefit from a low excise tax, which further explains the current and future performance of the industry.

As a result of this expected growth in the industry, it is imperative to include in the thrusts of firms who are part of the industry to promote their respective corporate social responsibility (CSR) measures. For instance, according to Lewis (2010), the San Miguel Corporation (SMC), the holding company of SMB, established the San Miguel foundation that provides programs for community and enterprise development, education, environment, and other disaster recovery related efforts. Accompanying this, SMB has its own charter in promoting livelihood in order to continuously anchor social development initiatives, one of which is the income augmentation project aimed to improve the livelihood of farmers by providing harvest facilities (San Miguel Brewery Incorporated [SMB], 2008).

Despite the impressive growth of the alcoholic and beverage industry and the active participation of various companies in CSR, alcoholism can cause severe consequences, which can range from physical violence and abuse to chronic illnesses. However, there is little statistical data on the scope of alcoholism and alcohol abuse in the Philippines but despite the lack of statistical figures, effects of alcoholism a very evident in communities and households. As mentioned by Valbuena (2006), there are still a number of cases associated with habitual alcohol drinking resulting to violence and sexual and drug abuse. Likewise, according to the WHO (2006), there is an alarming concern on the number of youth engaged in drinking that in the Philippines, 14 percent of those 15 to 24 years old were reportedly involved in physical violence ascribed with excessive drinking. As emphasized by Valbuena (2006), since there is little documentation on the number of cases concerning alcoholics, alcoholism is a growing concern in the Philippine society. As such, the Alcoholic Beverage Labeling Act of 2007 was ratified that requires alcoholic beverages manufacturers to include health warnings on every container and not selling alcoholic beverages to minors. However, this act is not considered as a major hindrance for local alcoholic manufacturers since their target markets are adults. Similarly, due to the festive atmosphere in the Philippines, consumers tend to outweigh the pleasure from drinking than the health costs derived from it.

2.3. The Sin Industries in the ASEAN Region

It is also of the essence to compare the state of the Philippine sin industry specifically the tobacco and cigarette industry as well as the alcoholic beverages industry with that of neighboring countries in the Association of the Southeast Asian Nations (ASEAN) region because of the region's huge economic potential due to its fast emerging global markets. Moreover, the industrial sector in the region is seen to be lucrative because ASEAN envisions an ASEAN Economic Community (AEC) by 2015 that aims to attain regional economic integration; achieve a single market and production base; become a highly competitive economic region and a region of equitable economic development; and a region fully integrated into the global economy (Association of the Southeast Asian Nations [ASEAN], 2009). These pillars are pre-requisite of one another wherein the region must achieve a single market and production base with the purpose of integrating the entire region into the global economy. Consequently, the

demand for both intermediate and final outputs will increase as the clientele expands due to regional integration. On course, tobacco manufacturers continuously innovate to increase production and to promote its products. With the implementation of a single market and production based in the region, tobacco manufacturers can enjoy a much greater flexibility and further expand their commercial interests and scope.

Looking at the case in Indonesia, according to EI (2012a), despite government efforts to regulate tobacco production, there was still an increase in growth last 2010. The annual increase in excise tax pushed cigarette prices to increase but the number of consumers remained the same due to the rise of economy brands. The surge in cigarette prices ironically contributed a stronger growth value as compared to 2009. According to Barber, Ahsan, Adioetomo & Setyonaluri (2008), the demand for tobacco products are inelastic. As such, the increase in excise tax will prompt a surge of IDR 23.8 to IDR 75.8 trillion additional revenues notwithstanding the reduction in sales volume. In addition, the existence of market failures for the tobacco industry due to asymmetric information about health risks enticed Indonesian smokers to smoke before the age of 19. With this, the Indonesian government aims to annually increase excise tax on tobacco products, which is seen to be a major hindrance in the growth of the tobacco industry. According to EI (2012a), the government has also setup the tobacco industry roadmap from 2010 to 2015 that will focus on state revenues from excise tax, health, and labor. However, despite of the strict government regulation, the tobacco industry is still forecasted to experience a 3 percent growth per year as the industry continues to play a significant role due to the tax revenues generated and employment capabilities. Meanwhile, according to Barber, Ahsan, Adioetomo & Setyonaluri (2008) the tobacco industry ranked 48 out of the 66 sectors contributing to employment in the country. Likewise, the Indonesian government is also steadily increasing excise tax on alcoholic beverages since April 2010 as reported by EI (2012a). As a result, there was a moderate decline in sales volume last 2010 that regardless of the positive economic growth and higher disposable income, a positive growth was not generated in the alcoholic and beverages industry in Indonesia because the imposition of excise tax heavily shocked the sales volume of beer, which accounts for bulk of sales in the industry. Furthermore, increasing awareness on the health risk of alcoholism prompted Indonesians to control consumption on alcoholic beverages. However, according to Saksono & Monalisa (2011), the alcoholic beverage industry is expected to remain stagnant since the industry is included in the negative investment list. That is, in 2010, the industry was valued at IDR 737 billion, which is also the valuation in 2011 due to tight government regulations.

On the other hand, looking at the case of Malaysia, the tobacco industry continues to play a significant role in their economy. According to the British American Tobacco [BAT] (2010), there are 355 tobacco curers, 1,300 grower curers, 20,525 farm families, 25,384 station workers, and as well as 4,000 cigarette employees employed in cigarette manufacturing firms in the country. On an annual basis, the Malaysian tobacco industry generates MYR 150 million of which 38 percent goes to farmers, 18 percent goes to curers, and the rest to suppliers of plastic, fertilizers, fuels, machinery and others. In addition, the industry ranks 5 out of the 92 sectors with a total economic output valued at MYR 11.7 billion or 3 percent of the country's GDP. In 2004, the industry contributed MYR 1.8 billion and MYR 683 million worth of indirect and corporate taxes respectively as per the reports of the Malaysian Ministry of Primary Industries (MPI) in the country. Furthermore, the MPI reported that the industry is very competitive with

other ASEAN countries in producing tobacco products since the cost of production in Malaysia is quite lower. Meanwhile, for the alcoholic beverages industry of the country, Malaysians spend approximately USD 500 million per year on alcoholic beverages. Similarly, per capita beer consumption is reported to be at 11 liters, which is at par with that of European nations who are known to be heavy consumers of beer (Asunta, 2001). According to Tan, Yen & Nayga (2009), recent types of vices are flourishing in Malaysia, one of which is the alcoholism wherein from the recorded per capita consumption at 7 liters in 2006, which was only 1.06 liters in the previous years. As such, the industry is still expected to exhibit growth due to increasing tourism arrivals and resident population accompanied by the increasing sophistication amongst Malaysians that will help promote the growth of premium beer and other alcoholic beverages (EI, 2012b).

On the other hand, in Thailand, according to the Kenan Institute of Asia [KIA] (2009), expenditure on tobacco products amounted to THB 129 per month. The tight regulation of the Thai government has successfully imposed a tobacco tax amounting to 75 percent of the retail price since 2001. Unfortunately, the hope of the government to reduce consumption through tax imposition has not been so effective since local and foreign manufacturers are able to absorb the tax increase rather than passing the burden to the consumers. Though these regulations have successfully decreased smoking rates from 58 percent to 38.9 percent in men and 5 percent to 2.4 percent in women in the 1990s, recent reports have shown that the total number of smokers is steadily increasing. The government plans to further regulate and control the industry through the imposition of tobacco tax amounting to 80 percent of the retail price will contribute an additional THB 2,000 to THB 3,000 million as per calculations by the Thai Health Promotion Foundation. Moreover, in recent times, as consumers shift their patronage from traditional stores to convenience stores, international brands are having more exposure leading to further increase in sales volume and the market is still expected to experience a positive growth despite the continuous price increases (EI, 2012e). Similarly, alcoholic beverage industry in Thailand behaves correspondingly with other ASEAN countries wherein their industry is also dominated by local players. According to EI (2012e), beer and spirits are considered the core products of the industry. Moreover, the recovery of the Thai economy and the people's lifestyle is a strong determinant of the industry's future. As the country's nightlife continue to expand, prospective beverage companies from all over the country and the region will continue to enter and stimulate the drinking habit of the Thai population.

Lastly, Singapore is known to have strict regulations when it comes to the sin industries. However, despite these, smoking in Singapore has been steadily rising. Despite fewer public areas for smoking and the prices of cigarette is the highest in Singapore, the cigarette industry still hit a four year high in 2009. According to the Ministry of Trade and Industry (2011), approximately 6.7 million cigarettes were lit up on a daily basis translating to 2.44 billion cigarettes sold during the year. Moreover, according to the Health Promotions Board's National Health Surveillance Survey in 2007, 13.6 percent of the sample was smokers during 2007, which is 12.6 percent higher than in 2004. To address this increasing number of smokers in the country, the Singaporean government utilizes public education through health risks with the intention of not only raising awareness but also helping those who are keen to quit smoking. On the other hand, expenditures on alcoholic beverages and tobacco products exhibited growth for the past years that in 2009, expenditure was recorded at USD 2,263.7 million which is 9.1 percent higher

than in 2008 with an expenditure of USD 2,075.8 (Ministry of Trade and Industry, 2011). Additionally, local companies specifically *Asia Pacific Breweries Ltd* dominates the playing field with half of the overall market share in the country. The company's success is attributed to the strong brand equity of the product it distributes accompanied with high quality standard products appealing to Singaporean palate. It is important to note that according to EI (2012d), the outlook for Singapore's economy is to experience continuous positive growth which positively affects the alcoholic beverage industry. The unceasing rise of disposable income and higher purchasing power will prompt locals to have higher possibilities to spend greater amounts during dining out and social events. Lastly, as more consumers participate in social drinking, it is the responsibility of the companies to competitively produce the best products to its clientele.

2.4. Other Philippine Studies on Sin Industries

A small number of studies exist with regards to the use of I-O in the Philippines specifically on the tobacco and cigarette industry as well as the alcoholic beverage industry. This is due to data constraint being experienced in the Philippines wherein as of the completion of this study, the latest I-O table in the country is still for the year 2000. Although information and policy generated by this data from contemporary studies can be deemed outdated, it can still be a source of methodological technique and a source of information that provides picture about the Philippine economic sectors for the said year.

For instance, a study conducted by Cubinar, Soliven & De Guzman (2007) used the 2000 Asian International Input and Output table in order for them to analyze the interdependency of the industries of the Philippines and China; to determine the effects of stimulating Philippine exports to China; and to find out the industrial structures of both countries. Although the study did not primarily focus on the sin industries, it was able to discuss partially the said industry. The results of Cubinar, Soliven & De Guzaman (2007) indicated that under the output structure, the bulk of the manufacturing sector of the Philippines is composed of food; beverages and tobacco; machinery and petroleum; and petroleum products. The aggregate direct and indirect effect of induced production for the Philippines for the year 2000 amounted to USD 103.72 billion, which is implies that for every dollar of final demand, the country is required to produce USD 1.47 of production. On the contrary, the direct and indirect induced production generated by the Philippines to China is valued at USD 1.54 billion implying that the Philippines is required to produce USD 1.29 production to attain the Philippines' dollar production of export level to China. Additionally, 63.3 percent of the Philippine production was induced by local demand whereas 35.7 percent was induced by the Philippine export to the rest of the world and the remaining 1 percent goes to China.

Furthermore, according to the findings of Cubinar, Soliven & De Guzman (2007), amongst the production sector in the Philippines the following sectors recorded the highest total output level that is induced by domestic demand – services, food, beverages, and tobacco. On the other hand, machinery, trade, and transport sectors recorded the highest total output level induced by the Philippines' exports to China. In terms of backward and forward linkages in the Philippines, only the food, beverage, and tobacco industries recorded the highest index of dispersion at 1.005 for the year 2000. Moreover, food, beverages, and tobacco industries were the only industries considered to be the highest users of raw materials and are major suppliers of

the other 24 sectors in the economy.

On the other hand, the study of Kim, Secretario & Kaneko (2010) measured the economic differences within and among regions and the extent of inter-dependence between regions in the Philippines. Based from the output structure, the National Capital Region (NCR) was responsible for 32.9 percent of the Philippines' total gross production valued at USD 139.0 billion in 1994. It is followed by Southern Luzon at 22.5 percent; Mindanao at 16.3 percent; Visayas at 28 percent; and Central Luzon at 14 percent. Meanwhile, the production in NCR is mainly concentrated in the manufacturing and services sector with the top producing sectors namely food, beverages, tobacco, finance, real estate and business services, manufacturing of other goods, and trade. With regards to the backward and forward linkages, the food, beverages, and tobacco industries consume the most intermediate inputs that in NCR alone, the food, beverages, and tobacco industries accounted for a slightly higher backward linkage effect.

Meanwhile, a study done by Mansan (2003) emphasized on the industry benchmarks for the value-added tax (VAT); the ratio of VAT-able purchases to VAT-able sales; and the effective VAT rate. In this study of Manasan (2003), a 230x230 IO table was used to show that the average ratio of VAT-able purchases to the value of output for all VAT-able sectors amounted to 0.383. In using the IO table, the lowest ratio of VAT-able input to total output is the tobacco leaf flue-curing and redrying sector registering at 0.06 with an effective tax rate of 9.4 whereas cigarette manufacturing and cigar, chewing and smoking tobacco registered at 0.49 and 0.39 respectively. Furthermore, results also showed that effective tax rates were calculated at 5.1 for the former and 6.1 for the latter. On the other hand, alcoholic liquors and wine registered a ratio of VAT-able input to total output at 4.8 with an effective tax rate of 5.2. The other alcoholic beverages beside from the one mentioned are the malt and malt liquors registering at a 0.30 VAT ratio and a 7.0 effective tax rate.

III. Operational Framework and Methodology[3]

The Input-Output (I-O) methodology is utilized to examine the interdependence between industries in an economy. As such, the dataset used in this study is the year 2000 240x240 I-O table of the Philippines released by the National Statistical Coordination Board (NSCB) in 2006. This I-O table includes the *Tobacco*; *Cigarette Manufacturing*; *Cigar, Chewing and Smoking Tobacco*; *Tobacco Leaf Flue-Curing and Redrying*; *Alcoholic Liquors and Wine*; and *Malt Liquors and Malt*, which will be used to measure the activities of the tobacco and cigarette as well as the alcoholic beverages industries.

In constructing the I-O table, the NSCB of the Philippines assumed that all outputs produced by an industry have the same input structure and an output has the same input structure no matter what industry produces it. Given these assumptions, by Equation 1, the total output of the i^{th} sector denoted by x_i is the sum of the inter-industry sales of sector i to sector j denoted by z_{ij} and the final demand for the i^{th} sector's product denoted by f_i.

[3] The methodology utilized in this study was adapted from Yu (2011).

$$x_i = \sum_{j=1}^{n} z_{ij} + f_i \tag{1}$$

Moreover, the matrix of technical coefficients, denoted by *A*, can be derived from Equation 1 by dividing the intermediate transactions matrix, denoted by *Z*, by the total inputs, which is given by Equation 2.

$$a_{ij} = \frac{z_{ij}}{x_j} \tag{2}$$

Assuming that a_{ij} is fixed, it implies that the proportion of sector *i*'s input to sector *j*'s output is held constant. Thus, Equation 2 can be re-expressed as Equation 3.

$$z_{ij} = a_{ij} x_j \tag{3}$$

Equation 3 can be substituted to Equation 1 and will yield Equation 4, which can then be rewritten as Equation 5. Using matrix notation, Equation 5 can be expressed into Equation 6.

$$x_i = \sum_{j=1}^{n} a_{ij} x_j + f_i \tag{4}$$

$$(1 - a_{ij}) x_i = \sum_{j=1}^{n} a_{ij} x_j + f_i \tag{5}$$

$$(I - A)X = \sum_{j=1}^{n} Ax + f_j \tag{6}$$

Let $Y = \sum_{j=1}^{n} Ax + f_j$. Solving for *X* in Equation 6 will yield Equation 7, where $(I - A)^{-1}$ is the inverse matrix of (*I* – *A*). From the inverse matrix, the multipliers that will represent the economic impact of an exogenous change in the tobacco and cigarette industry as well as the alcoholic beverage industries to industry output, aggregate economic output, and industry income can now be determined.

$$X = (I - A)^{-1} Y \tag{7}$$

3.1. Output Multiplier

An output multiplier for a specific sector is defined by Blair & Miller (2009) as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for the said sector's output. This is being represented by Equation 8 where γ_j is the output multiplier of sector *j*; a_{ij} is the ij^{th} element of the Leontief inverse matrix; and *n* is the dimension of the Leontief inverse matrix.

$$\gamma_j = \sum_{i=1}^{n} a_{ij} \tag{8}$$

3.2. Domestic Multiplier

The domestic multiplier, as defined by Jones (2007), indicates the change in gross domestic product brought about by a dollar increase in final demand in a sector. The domestic multiplier is represented by Equation 9 where ψ_j is the domestic multiplier of sector *j*; D_{ij} is the direct impact of a change in final demand for sector *j* on sector *i*; and ID_{ij} is the indirect impact of a change in final demand for sector *j* on sector *i*.

$$\psi_j = \sum_{i=1}^{n} \left(D_{ij} + ID_{ij} \right) \tag{9}$$

3.3. Income Multiplier

Households purchase goods and services using the income that they receive. The income multiplier, as mentioned by Blair & Miller (2009), allows us to explore the impact of a change in final demand for sector *j* on households' income. It is represented by Equation 10 where ϖ_j is the income multiplier of sector *j*; Φ is the compensation row of the matrix of technical coefficients; $(I-A)_j^{-1}$ is the j^{th} column of the Leontief inverse matrix.

$$\varpi_j = \Phi \cdot \left(I - A \right)_j^{-1} \tag{10}$$

3.4. Backward Linkages, Forward Linkages, and Net Backward Linkages

The analysis in this study can be extended to compute for the inter-industrial linkage of an industry to other industries as a user of inputs and as a provider of inputs to other industries. This is essential in determining the relative importance of an industry to other industries and vice-versa. The backward linkages, as defined by Blair & Miller (2009), serves as an indicator of an industry's relative importance as a user of inputs from the production sector. Blair & Miller (2009) suggested the use of a normalized index of the power of dispersion. This index is represented by Equation 11 where r_{ij} is the ij^{th} element of the Leontief inverse matrix.

$$\Xi = \frac{\sum_{i=1}^{n} r_{ij}}{\frac{1}{n}\left(\sum_{i=1}^{n} \sum_{j=1}^{n} r_{ij} \right)} \tag{11}$$

Meanwhile, the forward linkage, as defined by Blair & Miller (2009), serves as an indicator of an industry's relative importance as a supplier of inputs from the production sector. Similar to backward linkage, a normalized index to measure its importance will be used. The

index is specified by Equation 12 where r_{ij} is an element of the Leontief inverse matrix.

$$\Psi = \frac{\sum_{j=1}^{n} r_{ij}}{\frac{1}{n}\left(\sum_{i=1}^{n}\sum_{j=1}^{n} r_{ij}\right)} \tag{12}$$

Lastly, the net backward linkage, as defined by Dietzenbacher (2005) identifies the relative importance of an industry by comparing the resulting output from the industry's final demand and the output of said industry resulting from all other industries in the economy. It is represented by Equation 13.

$$\Lambda = \frac{\sum_{j=1}^{n} x_{ij}}{\sum_{i=1}^{n} x_{ij}} \tag{13}$$

IV. Results and Discussion

From the 2000 240x240 I-O table of Philippines, it was determined that the following industries related to tobacco and cigarette industry has the following effects on industrial output, aggregate economy, and income. First, for the tobacco and cigarette industry, it can be seen from Table 1 that the cigar, chewing and smoking tobacco industry has the largest multiplier effect among all industries related to tobacco and cigarette That is, for every PHP 1.00 increase in final demand for the cigar, chewing and smoking tobacco industry, it will result to a PHP 2.447248 increase in the output of this sector of the economy. This means that the PHP 1.00 increase in the said industry will contribute a PHP 1.447248 increase on its own output as well as its related industries. On the other hand, the tobacco industry has the lowest multiplier effect with only PHP 1.489854 for every PHP 1.00 increase in the final demand for the said industry. Meanwhile, as can be seen again in Table 1, it is the tobacco industry that has the highest income multiplier. That is, an additional PHP 1.00 in final demand for the tobacco industry will generate an additional PHP 0.3851967 increase in household income. On the contrary, the cigarette manufacturing industry has the lowest income multiplier with only PHP 0.1692304 for every PHP 1.00 increase in final demand for the said industry. Last but not least, the domestic multiplier, a measure of the change in GDP brought about by a PHP 1.00 increase in final demand in an industry, of the tobacco industry measured at PHP 0.986602 is the highest among all the sub-sectors of the tobacco and cigarette industry closely followed by the cigarette manufacturing with PHP 0.961698. Alternatively, assuming a PHP 1.00 increase in the exports of the tobacco industry will constitute a PHP 0.986602 reduction in the country's balance of payments (BOP) deficit. Although the tobacco and cigarette industry is not one of the main drivers of the economy, the industry still has a significant role in improving the lives of Filipinos through the tax revenues that it generates to the government and through the provision of employment and livelihood as emphasized by Balane (2009).

As can be seen from Table 2, among all the industries related to alcoholic and beverages industry, the alcoholic liquor and wine sector has the highest multiplier effect. That is, for every PHP 1.00 increase in final demand for the cigar, chewing and smoking tobacco industry, it will result to a PHP 2.350841 increase in the output of this sector of the economy. This means that the PHP 1.00 increase in the said industry will contribute a PHP 1.350841 increase on its own output as well as its related industries. On the other hand, the malt, liquor and malt industry has the lowest output multiplier effect with only PHP 1.794834 for every PHP 1.00 increase in the final demand for the said industry. Meanwhile, as can be seen again in Table 2, it is still the alcoholic liquor and wine industry that has the highest income multiplier. That is, an additional PHP 1.00 in final demand for the alcoholic liquor and wine industry will generate an additional PHP 0.2633188 increase in household income. On the contrary, the malt, liquor and malt industry has the lowest income multiplier with only PHP 0.1696477 for every PHP 1.00 increase in final demand for the said industry. Of equal importance is the domestic multiplier for the alcoholic beverages industry. From Table 2, it can be seen that malt, liquor and malt sector has the highest domestic multiplier computed at PHP 0.978254. That is, for every PHP 1.00 increase in the final demand for the said industry, the GDP of the country will increase by PHP 0.978254. It can also be deemed that for every PHP 1.00 increase in the exports of the malt, liquor and malt sector, the country's BOP deficit can be reduced by PHP 0.978254. As such, just like the tobacco and cigarette industry, the alcoholic beverages industry is also not considered as one of the main drivers of the economy. However, it also has a non-negligible role in improving the lives of the Filipinos, who find liquors irresistible, by providing income augmentation mechanisms and livelihood as explicated by SMB (2008).

Table 1
Multiplier Effect for the Tobacco and Cigarette Industry

Industry	Output Multiplier	Domestic Multiplier	Income Multiplier
Tobacco	1.489854	0.986602	0.3851967
Cigarette manufacturing	1.980610	0.961698	0.1692304
Cigar, chewing and smoking tobacco	2.447248	0.943745	0.1970856
Tobacco leaf flue curing and re-drying	2.441767	0.946590	0.2744499

With regards to accentuating the role of linkages among industries in the Philippines with particular attention to the tobacco and cigarette industry as well as the alcoholic beverages industry, the respective indices for backward, forward, and net backward linkages were determined using again the 2000 240x240 I-O table of the Philippines. These indices and the corresponding industrial ranking are presented in Table 3.

In terms of forward linkage, the tobacco industry ranked 104 out of the 240 industries with an index of power of dispersion calculated at 0.77376. Similarly, the cigarette manufacturing and cigar, chewing and smoking tobacco industries that ranked 204th and 195th respectively. However, it is interesting to note that the tobacco leaf flue-curing and re-drying ranked 87th with an index of power of dispersion calculated at 0.86067. This shows that among all the sub-sectors of the tobacco and cigarette industry in the Philippines, the tobacco leaf flue-curing and re-drying is the most important supplier of input to other industries for the entire economy. On a general note, this also shows that the interdependence with other sectors as a

supplier of raw materials is not as high relative to other sectors like wholesale and retail trade; petroleum refineries including LPG; electricity; and crude oil and natural gas that ranked the highest among all industries. However, it should not be disregarded that the tobacco industry is doing its share of supplying intermediate inputs from other sectors.

Table 2
Multiplier Effect for the Alcoholic and Beverages Industry

Industry	Output Multiplier	Domestic Multiplier	Income Multiplier
Alcoholic liquor and wine	2.350841	0.954515	0.2633188
Malt, liquor and malt	1.794834	0.978254	0.1696477

Table 3
Backward, Forward, and Net Backward Linkages
Tobacco and Cigarette Industry and Alcoholic Beverages Industry

Industry	Forward Linkage	Rank	Backward Linkage	Rank	Net Backward Linkage	Rank
Tobacco	0.77376	104	0.74202	215	1.04277	57
Alcoholic liquors and wine	0.55184	180	1.17083	39	0.47133	224
Malt liquors and malt	0.76619	108	0.89391	176	0.85712	94
Cigarette manufacturing	0.52732	204	0.98644	141	0.53457	197
Cigar, chewing and smoking tobacco	0.53490	195	1.21884	23	0.43886	233
Tobacco leaf flue-curing and re-drying	0.86067	87	1.21611	26	0.70772	135

In terms of backward linkage, the tobacco industry ranked 215 out of the 240 industries with an index of power of dispersion calculated at 0.74202. Similarly, the cigarette manufacturing and cigar, chewing and smoking tobacco industries that ranked 204th and 195th respectively. However, it is interesting to note that the tobacco leaf flue-curing and re-drying ranked 87th with an index of power of dispersion calculated at 0.86067. This shows that among all the sub-sectors of the tobacco and cigarette industry in the Philippines, cigar, chewing and smoking tobacco is the most important user of input of other industries for the entire economy followed by the tobacco leaf flue-curing and re-drying industry. On a general note, this also shows that the interdependence with other sectors as a user of raw materials is not as high relative to other sectors like manufacture of asphalt, lubricants and miscellaneous products of petroleum and coal; butter and cheese manufacturing; meat and meat products processing; manufacture and assembly of motor vehicles; and petroleum refineries including LPG. However, it should not be disregarded that the tobacco industry is doing its share of consuming intermediate inputs from other sectors.

Lastly, in line with the net backward linkage, the tobacco industry ranked the highest among all other sectors of the tobacco and cigarette industry while the malt, liquors and malt sector ranked higher than alcoholic liquors and wine. This implies that the output generated by the aforementioned sectors is larger than the output generated by other sectors' final demand of

your economy. On the other hand, the remaining sectors of the sin industries ranked much lower than the others. These indices indicates that the output generated by the final demand in the tobacco industry and the malt liquors and malt industry is larger than the amount of output generated by other sectors final demand, which further translates its relevance to the economy.

V. Conclusions and Policy Recommendation

This study was able to exposit that the sin industries in the Philippines specifically the tobacco and cigarette as well as the alcoholic beverages industries play a significant role in the Philippine economy as evidenced by the huge tax revenues the government generates over and above its contribution to aggregate output. Moreover, the active participation of local and foreign firms such as Philip Morris Incorporated, San Miguel Brewery Corporation, and other companies is indicative of the thriving sin industry in the Philippines. This is even furthered by their secure and stable performance that contributes significantly to economic growth. Subsequently, since these companies have an established market niche in the country, the consumers are faced with a wide array of products to choose from. However, it must also considered that most of the products that these industries produce have accompanying negative externalities such as lung cancer and COPD for smoking and the ill effects of alcoholism.

In order to measure and assess the economic contribution and magnitude of implication of the sin industries to its linkages, other related industries, and the aggregate economy, an I-O analysis was implemented and results have shown that all sectors of the sin industries are very responsive to changes in final demand as evidenced by their respective output multipliers. On the other hand, these industries are income inelastic as evidenced by their respective income multipliers and domestic multipliers. In terms of backward linkage, the alcoholic liquors and wine; cigar, chewing, and smoking tobacco; and tobacco leaf-flue curing and re-drying belongs to the top 40 industries who are important users of inputs from other industries in the Philippines. Meanwhile, for the forward linkage, none of the sectors ranked within the top 40 most important supplier of input to other industries in the Philippines. However, the tobacco leaf flue-curing and re-drying ranked 87th which is considered the most important supplier of inputs among all the sectors of the sin industry. This can be ascribed to the nature and purpose of the products the industry produces. That is, out of all the products being produced in an economy, products from majority of the sin industry are made to be consumed instead of highly being used as an intermediate input for other sectors. Lastly, for the net backward linkage, only tobacco and malt liquors and malt belonged to the top 100 industries. Explicitly, a big proportion of goods being produced from the tobacco and malt, liquors and malt industries are being used as a final good for consumption. It is essential to note that the higher is the rank for the net backward linkage; the final demand for the good in a certain sector is higher than the use of that sector’s output as input to other sectors.

Indeed, the specific sub-sectors of the sin industry have a huge potential in significantly contributing to the growth Philippine economy. Particularly, the large tax revenues generated by the government from the regulation of the sin industry in the country can be used for developmental purposes and pump priming. Not only do these industries contribute to growth, but it also generates employment and livelihood to various segments of the population. As such, it is imperative for the government to further develop and expand this industry to harness its

growth potential. However, it must be taken into consideration because it has accompanying social costs and negative externalities coming from the by-products of consumption of sin products such as pre-mature deaths, physical and sexual abuse, and productivity losses.

Accordingly, the dilemma here is whether the government should further restrict and regulate these industries as per WHO-FCTC with the intention of protecting the welfare of the society against the offshoots of sin product consumption. Given this, there is a need for the social planner to weigh the economic benefits against the social costs generated by the persistence of sin products produced by sin industries. If the government decides to enact further legislation on these sin industries through extensive taxation that will increases the prices of sin products, this may induce the consumers to reduce consumption but there is still continuous patronage because the demand for sin products are inelastic. On the other hand, if the government will further expand these industries, then the Philippine economy can harness its inclusive growth potential at the expense of diminished societal welfare due to the alarming negative externalities these industries generate.

By and large, developing these sectors of the so-called sin industry will not only help those who are involved in the tobacco and cigarette as well as the alcoholic beverages industry, but also those in wholesale and retail trade; manufacturing; agriculture; and other complementary industries, which are key sectors that benefit from the activities of the sin industry. Hence, the sin industry can contribute to inclusive growth wherein all industries have the opportunity contribute to and benefit from economic growth.

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VII. Appendix

Appendix 1
Backward, Forward, and Net Backward Linkages of Philippine Industries

Industry Code	Industry	Forward Linkage	Rank	Backward Linkage	Rank	Net Backward Linkage	Rank
001	Palay	1.35450	31	0.70478	224	1.92188	18
002	Corn	0.99050	69	0.68709	228	1.44159	25
003	Coconut including copra making in the farm	1.44101	24	0.60052	238	2.39961	13
004	Banana	0.68936	130	0.81133	201	0.84967	95
005	Sugarcane including muscovado sugar done in the farm	1.07302	55	0.80554	202	1.33205	32
006	Leafy and stem vegetables	0.65589	141	0.68835	226	0.95285	72
007	Other vegetables, tubers and root crops	0.67742	134	0.63508	233	1.06668	53
008	Pineapple	0.66236	138	0.66031	230	1.00310	64
009	Mango	0.59967	162	0.64535	232	0.92921	81
010	Citrus fruits	0.52796	203	0.66258	229	0.79683	108
011	Other fruits and nuts	0.58978	167	0.61123	235	0.96491	70
012	Tobacco	0.77376	104	0.74202	215	1.04277	57
013	Abaca	0.75793	111	0.94665	159	0.80065	107
014	Other fiber crops	0.69678	128	0.88480	179	0.78750	114
015	Coffee	0.68059	132	0.74110	216	0.91836	83
016	Cacao	0.54032	192	0.79094	204	0.68314	143
017	Rubber	0.72812	122	0.76034	211	0.95763	71
018	Ornamental/Horticultural plants/Herbal plants	0.51051	224	0.74644	213	0.68393	142
019	Other agricultural crops (wheat, milled oats, cereal crops, spice crops and construction related crops)	1.49147	22	0.59920	239	2.48912	11
020	Agricultural services (irrigation and pesticides, artificial insemination, n.e.c.)	2.17917	13	0.63493	234	3.43212	7
021	Hog	1.04967	61	0.84753	189	1.23851	37
022	Cattle	0.65285	145	0.74256	214	0.87919	91
023	Carabao	0.54139	191	0.72332	220	0.74849	124
024	Other livestock including dairy production	0.53664	193	0.74746	212	0.71796	130
025	Chicken	0.90514	80	0.89250	177	1.01417	61
026	Other poultry	0.56154	178	0.71076	222	0.79005	113
027	Egg production	0.65782	140	0.93386	165	0.70441	137
028	Ocean fishing (including fish corals)	1.11733	46	0.68730	227	1.62568	23
029	Inland and coastal fishing	0.61682	157	0.65605	231	0.94020	77
030	Pearl culture and pearl shell	0.67953	133	1.04814	103	0.64832	157

	gathering						
031	Seaweeds	0.54857	184	0.70583	223	0.77720	117
032	Shrimp, prawns and other aquaculture (including marine culture)	0.51887	211	0.73020	218	0.71058	133
033	Forestry	1.61851	18	0.60615	236	2.67016	9
034	Copper mining	0.91389	78	0.86633	184	1.05489	55
035	Gold mining	0.86918	85	0.85167	188	1.02056	60
036	Chromite mining	0.49810	235	0.85756	186	0.58083	177
037	Nickel mining	0.49881	232	0.82757	195	0.60275	170
038	Other metallic mining (including silver mining)	0.68565	131	0.73205	217	0.93662	78
039	Stone quarrying, clay and sand pits	0.86752	86	0.91896	166	0.94403	74
040	Coal mining	0.83180	92	0.90213	175	0.92204	82
041	Crude oil and natural gas	6.08556	4	1.13946	62	5.34076	4
042	Other non-metallic mining (including salt mining)	0.72828	121	0.79410	203	0.91712	85
043	Slaughtering and meat packing	1.16451	40	1.17097	38	0.99448	65
044	Meat and meat products processing	0.73411	119	1.34602	3	0.54539	195
045	Milk processing	1.47696	23	1.23067	19	1.20012	45
046	Butter and cheese manufacturing	0.65500	143	1.35681	2	0.48275	220
047	Ice cream, sherbets and other flavored ices	0.53439	196	1.26397	11	0.42279	237
048	Other dairy products	0.55119	182	1.04724	105	0.52632	202
049	Canning and preserving of fruits and vegetables	0.77575	102	1.00847	127	0.76924	120
050	Fish canning	0.79768	96	1.20127	29	0.66403	152
051	Fish drying, smoking and manufacturing of other seafood products	0.51530	216	1.06252	95	0.48498	218
052	Production of crude coconut oil, copra cake and meal	1.00982	65	1.01624	123	0.99369	66
053	Other crude vegetable oil, fish and other marine oils and fats (except coconut oil)	1.36798	29	1.04517	106	1.30886	34
054	Manufacture of refined coconut oil and vegetable oil	1.05237	59	1.30694	6	0.80522	106
055	Rice and corn milling	1.42420	26	0.98655	140	1.44361	24
056	Flour, cassava and other grains milling	0.88460	83	1.00516	128	0.88005	90
057	Manufacture of bakery products except noodles	0.57484	170	1.14079	60	0.50389	210
058	Noodles manufacturing	0.51487	217	1.23447	16	0.41708	238
059	Sugar milling and refining	1.04324	62	1.16242	45	0.89747	86
060	Manufacture of cocoa, chocolate and sugar confectionery products	0.64789	148	1.26966	10	0.51029	207
061	Manufacture of desiccated coconut	0.54541	187	0.95937	153	0.56851	183
062	Manufacture of ice, except dry ice	0.51916	210	1.07076	90	0.48485	219

063	Coffee roasting and processing	0.53400	197	1.06358	94	0.50208	212
064	Manufacture of animal feeds	1.10193	50	1.14081	59	0.96593	69
065	Manufacture of starch and starch products	0.62166	156	1.13542	65	0.54752	194
066	Manufacture of flavoring extracts, mayonnaise and food coloring products	0.76841	106	1.14211	58	0.67280	148
067	Miscellaneous food products	0.85745	89	1.20714	27	0.71032	134
068	Alcoholic liquors and wine	0.55184	180	1.17083	39	0.47133	224
069	Malt liquors and malt	0.76619	108	0.89391	176	0.85712	94
070	Softdrinks and carbonated water	0.58453	168	1.16842	43	0.50027	213
071	Bottling of Mineral Water	0.56443	175	0.71676	221	0.78748	115
072	Cigarette manufacturing	0.52732	204	0.98644	141	0.53457	197
073	Cigar, chewing and smoking tobacco	0.53490	195	1.21884	23	0.43886	233
074	Tobacco leaf flue-curing and redrying	0.86067	87	1.21611	26	0.70772	135
075	Textile, spinning, weaving, texturizing and finishing	2.48298	10	1.23754	15	2.00637	17
076	Fabric knitting mills	1.26092	34	1.14304	57	1.10313	52
077	Hosiery, underwear and outerwear (knitted)	0.54219	190	1.20228	28	0.45096	228
078	Manufacture of made-up textile goods except wearing apparel	0.95780	73	1.12846	70	0.84877	96
079	Manufacture of carpets and rugs	0.50873	225	1.27397	8	0.39933	240
080	Cordage, rope, twine and net manufacturing	0.88903	82	1.05284	101	0.84441	97
081	Manufacture of articles made of native materials	0.51721	213	1.15141	49	0.44919	229
082	Manufacture of artificial leather and impregnated and coated fabrics	1.00098	68	1.15720	48	0.86500	93
083	Manufacture of fiber batting, padding, upholstery fillings including coir, linoleum and other hard surfaced floor coverings	0.66904	135	1.00853	126	0.66338	154
084	Custom tailoring and dressmaking shops	0.53627	194	0.77671	209	0.69044	140
085	Manufacture of ready-made clothing	0.56371	176	1.17081	40	0.48147	221
086	Embroidery establishments	0.50520	227	1.07072	91	0.47183	223
087	Manufacture of other wearing apparel except footwear	0.50317	230	1.02475	115	0.49101	215
088	Manufacture of leather footwear and footwear parts	0.56779	173	1.14329	56	0.49663	214
089	Sawmills and planing of wood	1.69525	17	0.99860	132	1.69762	20
090	Manufacture of veneer and plywood	0.68946	129	1.13488	66	0.60752	169
091	Manufacture of hardboard and particle board	0.51574	214	1.10393	76	0.46718	227
092	Wood drying and preserving plants	0.53025	202	1.02278	118	0.51844	205

093	Millwork plants	0.59556	164	1.03095	109	0.57768	178
094	Manufacture of wooden and cane containers and small cane wares	0.75762	113	1.14022	61	0.66445	151
095	Manufacture of wood carvings	0.72357	123	0.88020	181	0.82205	103
096	Manufacture of misc wood, cork and cane products	0.56331	177	1.00280	130	0.56174	187
097	Manufacture and repair of wooden furniture including upholstery	0.63799	152	1.05951	98	0.60215	171
098	Manufacture and repair of rattan furniture including upholstery	0.51250	220	0.97317	149	0.52663	201
099	Manufacture and repair of other furnitures and fixtures, n.e.c.	0.93654	76	1.22363	21	0.76538	121
100	Manufacture of pulp, paper and paperboard	2.96602	8	1.17461	36	2.52511	10
101	Manufacture of paper and paperboard containers	1.19312	38	1.21931	22	0.97852	67
102	Manufacture of articles of paper and paperboard	1.12983	45	1.25955	12	0.89701	87
103	Newspapers and periodicals	0.57426	171	1.22839	20	0.46749	225
104	Printing and publishing of books and pamphlets	0.75923	110	1.14360	54	0.66389	153
105	Commercial and job printing and other allied industries	1.05651	58	1.13344	68	0.93213	80
106	Tanneries and leather finishing	1.26069	35	1.09263	80	1.15382	47
107	Manufacture of products of leather and leather substitutes except footwear and wearing apparel	0.64611	149	1.09497	79	0.59007	176
108	Rubber tire and tube manufacturing	0.78163	100	1.07863	84	0.72465	129
109	Manufacture of rubber footwear	0.53394	198	1.12506	72	0.47459	222
110	Manufacture of other rubber products, n.e.c.	0.94906	75	1.19538	32	0.79394	110
111	Manufacture of basic industrial chemicals	4.10400	5	1.12506	71	3.64780	6
112	Manufacture of fertilizers	1.14733	43	1.12420	73	1.02057	59
113	Manufacture of synthetic resins, plastic materials and other man-made fiber except glass	2.45319	11	1.02407	117	2.39554	14
114	Manufacture of pesticides, insecticides, etc.	1.09561	53	1.16376	44	0.94144	75
115	Manufacture of paints, varnishes and lacquers	1.50394	21	1.21759	25	1.23518	38
116	Manufacture of drugs and medicines	0.83490	91	1.23106	17	0.67820	145
117	Manufacture of soap and detergents	1.22360	36	0.99127	138	1.23437	40
118	Manufacture of perfumes, cosmetics and other toilet preparations	0.74925	114	1.19626	31	0.62633	164
119	Manufacture of miscellaneous chemical products	2.83780	9	1.14728	52	2.47350	12

120	Manufacture of plastic furniture, plastic footwear and other fabricated plastic products	2.07191	14	1.07835	85	1.92138	19
121	Petroleum refineries including LPG	8.66974	2	1.31094	5	6.61335	3
122	Manufacture of asphalt, lubricants and miscellaneous products of petroleum and coal	1.51550	20	1.46523	1	1.03431	58
123	Manufacture of pottery, china and earthenwares	0.51544	215	0.91024	171	0.56627	185
124	Manufacture of flat glass	0.74509	117	1.00876	125	0.73862	125
125	Manufacture of glass container	0.92558	77	1.09748	77	0.84336	98
126	Manufacture of other glass and glass products	0.73298	120	1.02512	114	0.71502	131
127	Cement manufacture	0.78818	97	1.12077	75	0.70325	138
128	Manufacture of structural clay products	0.65132	146	0.97392	148	0.66876	150
129	Manufacture of structural concrete products	0.54348	188	1.25278	13	0.43381	235
130	Manufacture of other non-metallic mineral products, n.e.c.	0.78286	99	0.93969	161	0.83311	101
131	Blast furnace and steel making furnace, steel works and rolling mills	3.27821	7	1.02126	120	3.20997	8
132	Iron and steel foundries	2.40542	12	1.14553	53	2.09983	16
133	Non-ferrous smelting and refining plants, rolling, drawing and extrusion mills	1.61252	19	1.14348	55	1.41018	27
134	Non-ferrous foundries	1.90454	15	1.15966	46	1.64233	22
135	Cutlery, handtools, general hardware	1.14767	42	1.13425	67	1.01183	63
136	Structural metal products	0.72261	124	1.02223	119	0.70690	136
137	Manufacture of metal containers	1.16482	39	1.23099	18	0.94625	73
138	Metal stamping, coating, engraving mills	0.76104	109	1.15061	50	0.66142	155
139	Manufacture of wire nails	0.82755	93	1.20008	30	0.68958	141
140	Manufacture of other fabricated wire and cable products except insulated wire and cable	0.91367	79	1.17040	41	0.78065	116
141	Manufacture of non-electric lighting and heating fixtures	0.50382	229	1.14939	51	0.43834	234
142	Manufacture of fabricated metal products except machinery and equipment	1.14006	44	1.02456	116	1.11273	51
143	Manufacture of agricultural machinery and equipment	0.61633	158	1.16959	42	0.52696	200
144	Manufacture of metal and wood-working machinery	0.66335	137	1.08489	82	0.61144	167
145	Manufacture of engines and turbines, except for transport equipment and special industrial machinery and equipment	1.11453	47	1.18471	35	0.94076	76
146	Manufacture, assembly and	0.60851	160	0.99664	133	0.61056	168

	repair of office, computing and accounting machines						
147	Manufacture of pumps, compressors, blowers and airconditioners	0.71694	126	1.00417	129	0.71396	132
148	Machine shops and manufacture of non-electrical machinery and equipment, n.e.c.	0.95230	74	1.03784	108	0.91758	84
149	Manufacture of electrical, industrial machinery and apparatus	1.43157	25	1.03076	110	1.38885	30
150	Manufacture of radio and TV receiving sets, sound recording and reproducing equipment including records and tapes	0.71593	127	1.05601	99	0.67796	146
151	Manufacture of communication and detection equipment	0.85634	90	1.06179	97	0.80650	105
152	Manufacture of parts and supplies for radio, TV and communication	0.89713	81	1.07406	87	0.83527	100
153	Manufacture of appliances and housewares	0.65910	139	1.04739	104	0.62927	163
154	Manufacture of semi-conductor devices	1.10469	49	0.97618	147	1.13164	49
155	Manufacture of primary cells and batteries and electric accumulators	0.64132	151	0.98639	142	0.65017	156
156	Insulated wires and cables	1.40599	27	1.13840	63	1.23506	39
157	Manufacture of current-carrying wiring devices, conduits and fittings	0.80727	94	0.99918	131	0.80793	104
158	Manufacture of electrical lamps, fluorescent tubes and other electrical apparatus and supplies, n.e.c.	0.79914	95	1.01066	124	0.79072	111
159	Shipyards and boatyards	0.53069	201	1.08678	81	0.48832	216
160	Manufacture and assembly of motor vehicles	0.73555	118	1.31520	4	0.55927	191
161	Rebuilding and major alteration of motor vehicles	0.54808	185	0.95557	154	0.57356	182
162	Manufacture of motor vehicles parts and accessories	1.35703	30	1.12889	69	1.20209	43
163	Manufacture, assembly of motorcycles and bicycles	0.52615	206	1.08136	83	0.48657	217
164	Manufacture, assembly, rebuilding and major alteration of railroad equipment, aircraft, and animal and hand-drawn vehicle	0.65059	147	0.96196	152	0.67632	147
165	Manufacture of professional, scientific measuring and controlling equipment	0.72243	125	1.06197	96	0.68028	144
166	Manufacture of photographic and optical instruments	0.60296	161	1.06830	92	0.56441	186

167	Manufacture of watches and clocks	0.51192	222	0.96393	151	0.53107	198
168	Manufacture and repair of furniture and fixtures, made primarily of metal	0.54792	186	1.17206	37	0.46748	226
169	Manufacture of jewelry and related articles	0.62224	155	0.98383	145	0.63246	162
170	Manufacture of musical instruments	0.52534	207	0.95355	156	0.55093	193
171	Manufacture of sporting and athletic goods	0.53181	200	1.19167	33	0.44627	231
172	Manufacture of surgical, dental, medical and orthopedic supplies	0.58398	169	1.02868	112	0.56770	184
173	Manufacture of opthalmic goods	0.63032	154	1.15957	47	0.54358	196
174	Manufacture of toys and dolls except rubber and plastic toys	0.50113	231	1.12253	74	0.44644	230
175	Manufacture of stationers', artists' and office supplies	0.78658	98	0.99518	134	0.79039	112
176	Miscellaneous manufacturing	1.00618	66	0.99379	136	1.01247	62
177	Construction	0.96248	72	0.99012	139	0.97208	68
178	Electricity	6.71120	3	0.82461	196	8.13868	2
179	Steam	1.01650	64	0.82892	193	1.22630	41
180	Water	1.00303	67	0.72469	219	1.38409	31
181	Railway transport	0.52474	208	1.02099	121	0.51395	206
182	Bus line operation	0.76978	105	1.05576	100	0.72913	128
183	Public utility cars and taxicab operation	0.56593	174	1.07624	86	0.52584	203
184	Jeepney, tricycles (motorized and non-motorized) and other road transport	0.77413	103	1.05230	102	0.73565	127
185	Tourist buses and cars including chartered and rent-a-car	0.58991	166	0.99504	135	0.59285	174
186	Road freight transport	0.77785	101	1.01955	122	0.76294	122
187	Sea and coastal water transport	0.76820	107	1.09658	78	0.70054	139
188	Inland water transport (including renting of ship with operator)	0.54905	183	1.23757	14	0.44365	232
189	Supporting services to transport	0.65286	144	0.84262	190	0.77480	118
190	Air transport	1.09709	52	1.30547	7	0.84038	99
191	Tour and travel agencies	0.52653	205	1.04279	107	0.50492	209
192	Activities of other transport agencies (including custom brokerage, n.e.c)	0.65562	142	1.13586	64	0.57720	179
193	Storage and warehousing	0.63661	153	0.94793	158	0.67158	149
194	Postal and courier activities	0.88421	84	0.94601	160	0.93467	79
195	Telephone service includes telegraphs	1.38367	28	0.83950	192	1.64821	21
196	Wireless telecommunications	0.97508	70	0.77739	208	1.25429	36
197	Telecommunication services, n.e.c	0.85878	88	0.81545	199	1.05314	56
198	Wholesale and retail trade	10.10612	1	0.84234	191	11.99765	1
199	Repairs of motor vehicles and	0.61134	159	0.95128	157	0.64265	160

	personal and household goods						
200	Banking	3.96606	6	0.88152	180	4.49911	5
201	Investment, financing and other non-banking services except pawnshops	1.03173	63	0.78912	205	1.30745	35
202	Pawnshops	0.49833	234	0.86386	185	0.57686	180
203	Life insurance	0.50811	226	0.78494	206	0.64733	159
204	Non-life and other insurance activities	1.15920	41	0.82051	198	1.41278	26
205	Real estate activities with own or leased property and contract basis	1.73753	16	0.76644	210	2.26702	15
206	Ownership of dwellings	0.49805	237	0.55910	240	0.89081	88
207	Public Education Services	0.49805	238	0.60585	237	0.82207	102
208	Public Health and Welfare Services	0.49805	239	0.88712	178	0.56142	188
209	Public Administration and Defense	0.49805	240	0.82757	194	0.60182	172
210	Private education services	0.52321	209	0.82220	197	0.63635	161
211	Private medical, dental and other health services	0.57407	172	0.91838	167	0.62509	165
212	Other hospital activities and medical and dental practices, including veterinary services	0.53313	199	0.69237	225	0.77001	119
213	Legal activities	0.74539	116	0.93617	163	0.79622	109
214	Accounting, bookkeeping and auditing activities; tax consultancy	0.74741	115	0.85546	187	0.87370	92
215	Architectural and engineering activities	1.27931	33	0.90728	174	1.41004	28
216	Advertising activities	1.05936	56	0.91341	170	1.15978	46
217	Renting of equipments	1.11209	48	0.97998	146	1.13481	48
218	Business and management consultancy activities	1.32196	32	0.93929	162	1.40740	29
219	Labor recruitment and provision of personnel	1.10017	51	0.90948	173	1.20967	42
220	Investigation and security activities	0.96256	71	0.90969	172	1.05812	54
221	Miscellaneous business activities, n.e.c.	0.55167	181	0.98578	143	0.55963	190
222	Other business services	1.07780	54	0.95409	155	1.12966	50
223	Hotels and motels	0.66717	136	1.03019	111	0.64762	158
224	Other short-stay accommodation, n.e.c.	0.54332	189	1.07155	88	0.50704	208
225	Restaurants, bars, canteens andother eating and drinking places	1.05225	60	1.18941	34	0.88469	89
226	Computer hardware consultancy	0.51433	218	1.27158	9	0.40448	239
227	Computer software consultancy including computer supply	0.75765	112	1.02753	113	0.73735	126
228	Other computer related activities	1.05672	57	0.87953	182	1.20146	44

229	Maintenance and repair of office, accounting and computing machinery	0.59356	165	0.77902	207	0.76193	123
230	Photographic activities	0.59691	163	1.06439	93	0.56080	189
231	Call/Contact centers, Business Processing outsourcing and other IT-based services	0.50493	228	0.81178	200	0.62200	166
232	Social Work	0.49835	233	0.99190	137	0.50242	211
233	Sewage and refuse disposal, sanitation and similar activities	0.55418	179	0.93565	164	0.59230	175
234	Motion picture and video production and distribution	0.64208	150	1.07130	89	0.59935	173
235	Motion picture projection	0.51752	212	1.21764	24	0.42502	236
236	Radio and television activities	1.21923	37	0.91834	168	1.32766	33
237	Other recreational and cultural services	0.51212	221	0.91786	169	0.55795	192
238	Washing and dry-cleaning of clothing and textile	0.51368	219	0.96852	150	0.53037	199
239	Hairdressing and other beauty treatment	0.49806	236	0.86722	183	0.57432	181
240	Other personal services, n.e.c.	0.51156	223	0.98461	144	0.51955	204