

# Do Investments Respond to Taxation and Incentives? Evidence from the Philippines

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## Abstract

In this paper, accelerator models are estimated to assess the responsiveness of industry investments to changes in tax rates and incentives. The cross-sectional analysis uses data from the 2009 and 2010 waves of the Annual Survey of Philippine Business and Industry covering 27,575 and 29,298 firms, respectively, spread over 942 industry subclasses. This data set is supplemented by administrative data on fiscal incentives. The results show that tax rates and incentives can explain inter-industry variations in investment levels. The investment-tax and investment-subsidy relationships are found to be non-linear. Reduced taxes predict higher investments, with larger effects for industry groups that already have previous investments. Increased incentives predict larger investments, with the investment effects varying in size across industries. A modified version of the model, which was estimated using time-series data from 1973 to 2014, validated the study's cross-section results. The findings lend support to current legislative initiatives to lower corporate income tax rates and rationalize fiscal incentives.

**Keywords:** corporate income tax, fiscal incentives, investments, subsidies

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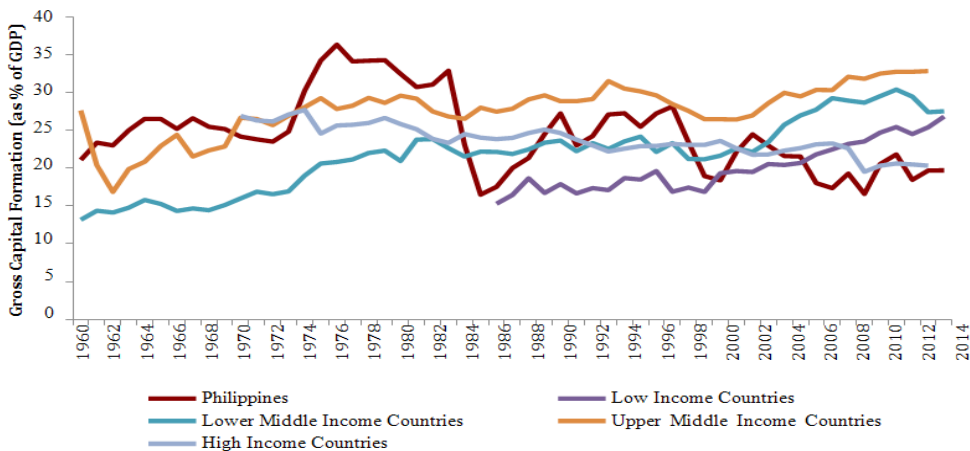
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## Introduction

Capital formation and income growth are tightly linked, with predictions of the Solow model consistently borne out by empirical evidence in various study settings. Robinson has found that during the 1950s and 1960s, capital investment was an important source of growth for less developed countries.<sup>1</sup> Using cross-country data for the period 1960-1985, Mankiw et al. show that physical and human capital accounted for about 80 percent of cross-country income variations.<sup>2</sup> For a sample of 95 developing countries between 1970-1990, Khan and Kumar have found that while both public and private investments contribute positively to growth, private investment had a stronger impact.<sup>3</sup> Karras, using averaged annual data from 152 countries, shows that investment rate is significant in positively influencing the growth rate of real gross domestic product per capita.<sup>4</sup> Meanwhile, Bond et al., using time series regressions of 94 countries, has found that increased investment-to-GDP ratio predicts higher level and higher growth rates of output per worker.<sup>5</sup>

Yet, many low-income countries continue to face low levels of gross capital formation (GCF). Thus, an important policy question is whether there are obstacles to investments that could be limiting a country's economic growth and development potential. Figure 1 shows that the share of gross capital formation in total gross domestic product (GDP) differs widely between middle- and high-income countries versus low-income countries.



**Figure 1. Gross Capital Formation as percent of GDP, 1960-2014**  
 Source: Philippine Statistics Authority and World Bank

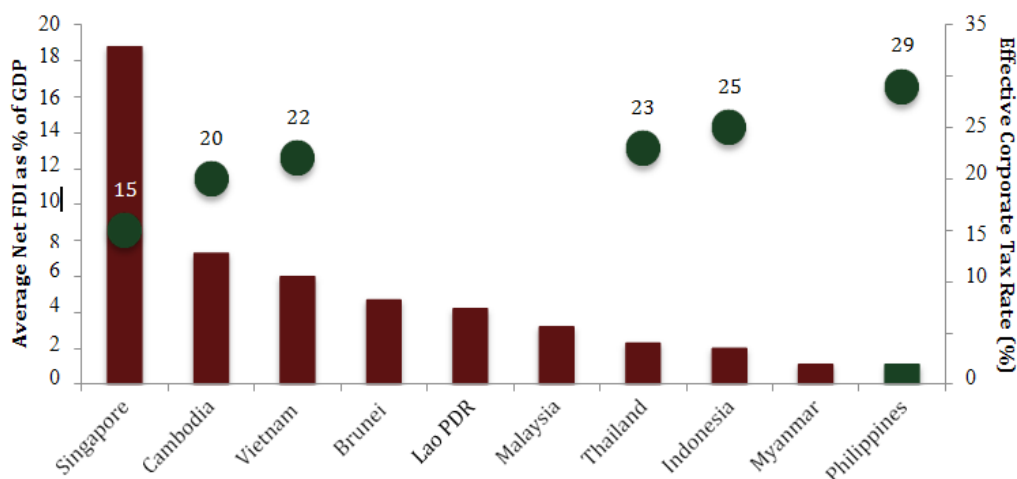
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The Philippines is arguably an interesting case. By World Bank standards, it is classified as a lower middle-income country. As a group, the GCF of lower middle-income countries is relatively high. It was in the 28-30 percent range over the last five years and highly comparable to upper middle-income countries. The latter have been the best performers in terms of GCF since the 1970s. The Philippines' GCF levels, however, were below even those of low-income countries, at least in the last decade. Yet, from the 1960s to the early 1980s, GCF levels of the Philippines were among the highest, even higher than those of upper middle-income countries.

Scholars of Philippine economic history have pointed out a number of possible explanations for these recent low levels of GCF. Using data from the 2005 Investment Climate Survey, a joint study by ADB and World Bank found that small and medium enterprises have limited access to credit, or no access at all to overdraft or credit line facilities.<sup>6</sup> A 2007 study by ADB has also stated that “low levels of investment in and the poor conditions of infrastructures in the Philippines have increased the cost of doing business in the country and had a significant adverse effect on the competitiveness and attractiveness of the Philippines as an investment destination.”<sup>7</sup> The study further recognized the following factors that may affect the “appropriability” of returns to investments in the Philippines: periodic macroeconomic instabilities, poor governance, high tax rates, inefficiencies and lack of transparency in the tax administration, cumbersome business procedure, and overregulation.

Recent surveys on the cost of doing business also suggest that tax policies could explain low GCF levels. According to the Global Competitiveness Report 2015-2016, taxes—particularly complex tax regulations and high tax rates—are cited by firms as among the top reasons for the high cost of doing business and an important barrier to investments.<sup>8</sup> Against the backdrop of the Association of Southeast Asian Nations (ASEAN) Economic Community, a more current policy concern is whether the tax rates faced by Philippine firms reduce competitiveness levels and ultimately reduce the attractiveness of foreign direct investments (FDI). Figure 2 shows that the Philippines has the lowest average net FDI inflows (as a share of GDP) among ASEAN member-countries from 2009 to 2013.

The average corporate income tax rate among ASEAN member countries is 23 percent. Singapore has the lowest tax rate (17 percent of net taxable income), while the Philippines has the highest rate (30 percent). The country with which the Philippines can be most closely compared, Indonesia, imposes a 25 percent corporate income tax rate. Vietnam and Cambodia, whose foreign



**Figure 2. Average Net FDI Inflows and Corporate Tax Rates† of ASEAN Countries, 2009-2013**

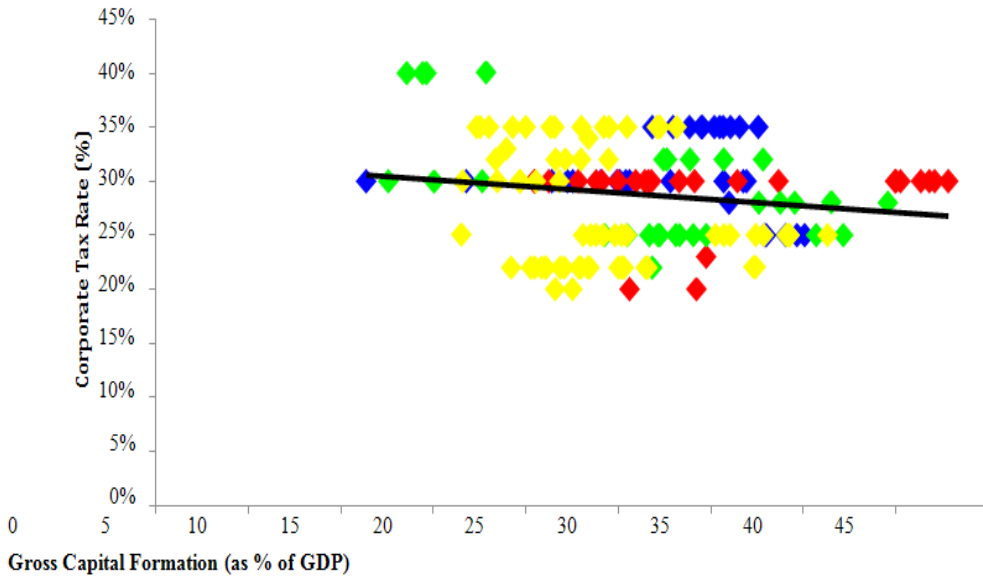
Sources of basic data: ADB Key Indicators for Asia and the Pacific 2015, Philippine laws, and various sources (see references)

direct investment rates are among the highest in the region, have lower rates (22 percent and 20 percent, respectively). Figures 2 and 3 show how, among the Philippines and other ASEAN member-states, corporate income tax rates are inversely related to GCF ( $p < 0.047$ ).

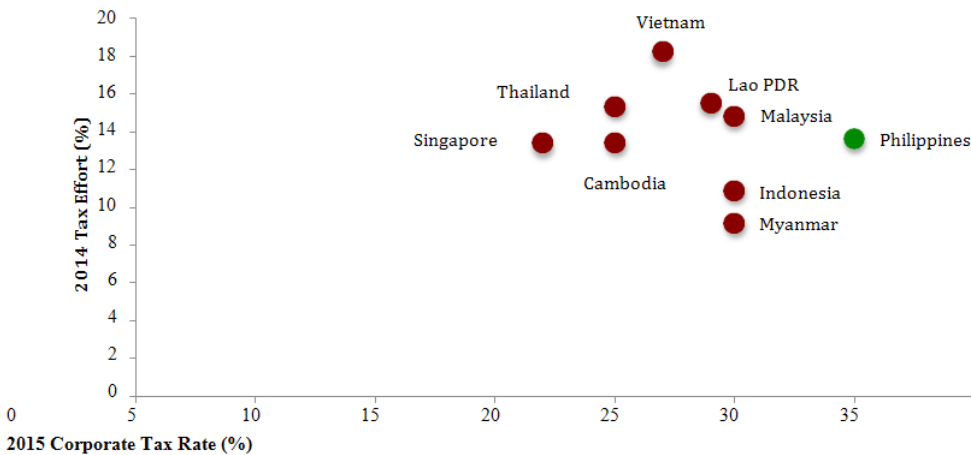
While within the ASEAN region the Philippines imposes the highest corporate income tax rate, it curiously registers one of the lowest tax efforts at only 13.6 percent of GDP in 2014. Figure 4 suggests that the Philippines can potentially lower its tax rate to Cambodia’s 20 percent and achieve a similar tax effort. Having the highest corporate income tax rate within the ASEAN region poses a concern due to the adverse impact it has on the locational decisions of firms, particularly footloose industries. Considering the country’s low level of infrastructure<sup>9</sup>, providing favorable tax treatments has been the go-to tool to attract investments. The 2015 ASEAN integration was an important consideration when Vietnam, Thailand, Indonesia, Brunei Darussalam, and

† ASEAN countries generally impose corporate income tax rates on a similar tax base except for (1) Singapore, which allows the first SGD152,000 to be tax-exempt, and (2) the Philippines, which applies a different tax treatment on passive income (i.e., 20 percent tax on interest, royalties, and dividends). The effective corporate tax rates presented above were calculated for firms with an average net taxable income of PhP44.5 million, with 10 percent coming from passive income. The comparison shows that only Singapore and the Philippines have effective corporate taxes lower than their nominal corporate tax rates.

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**Figure 3. Corporate Tax Rates and Gross Capital Formation: Philippines (1946-2014), Indonesia (1984-2014), Thailand (1990-2014), and Vietnam (1986-2014)**  
 Legend: Yellow - Philippines; Green - Vietnam; Red - Thailand; Blue - Indonesia  
 Sources: Philippine Statistics Authority, World Bank, Philippine laws, and various sources (see references)



**Figure 4. Tax Effort vs Corporate Tax Rates, ASEAN**  
 Notes: Tax effort data for Vietnam includes local government taxes. Tax effort data for Singapore was for 2013.  
 Sources of basic data: ADB Key Indicators for Asia and the Pacific 2015, Philippine laws, and various sources (see references)

Malaysia decided to lower their corporate income tax rates beginning in 2010. Thailand undertook the most drastic cut, from 30 percent in 2011 to 23 percent in 2013.

This paper seeks to determine whether tax rates faced by firms can explain low levels of capital formation. Accelerator models of investments using data are estimated from two waves of a nationwide survey of firms to examine the relationship between potential tax payments faced by firms and their investments in new tangible assets, and other measures of firm investment, particularly new entrants in industries and research and development expenditures. Variations in tax payments are exploited across industry subclasses and are empirically tested for whether these can explain variations in investments aggregated at the industry subclass level.

### **Corporation Taxation in the Philippines**

Philippine firms are subject to national and local taxes; some enjoy benefits in the form of fiscal incentives. National taxes are imposed and collected by the Bureau of Internal Revenue (BIR) and the Bureau of Customs (BOC). The current governing tax laws are Republic Act (RA) No. 8424, or the “Tax Reform Act of 1997,” and all its amendments (e.g., RA 9337, RA 9504) along with the implementing rules and regulations issued by the BIR.

#### **National Taxes**

National taxes in the Philippines include:

1. Corporate Income Tax

Corporate income tax (CIT) is 30 percent of net taxable income, defined as revenues minus total expenses, or net income. A minimum corporate income tax (MCIT) rate is imposed on firms with zero or negative taxable income, which is computed as 2 percent of annual gross income. The firm is subject to pay either the MCIT or the CIT, whichever is higher.<sup>i</sup> Corporate income taxes are collected in advance through the creditable/expanded withholding tax, which is equal or at least approximate to the CIT due from the recipient of the income and creditable against the income tax due from the corporation.

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<sup>i</sup> MCIT is imposed on the fourth taxable year of business operations. Any excess of the MCIT over the regular CIT (RCIT) shall be carried forward and credited against the RCIT for the 3 immediately succeeding taxable years. The MCIT is the mechanism that allows government to collect tax revenues in advance.

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Some industries are exempted from paying the CIT. In general, CIT exemptions can either protect or promote certain sectors. The Tax Code (RA 8424), for example, exempts labor, agricultural, or horticultural organizations and non-stock, non-profit mutual savings banks.<sup>ii</sup> CIT exemption is also offered to promote industries included in the Investment Priority Plan (IPP) of the Philippines. In recent years (2014-2016), the IPP included preferred activities in the four broad sectors of manufacturing, agribusiness and fishery, services, and infrastructure and logistics, and in four specific activities which include energy, housing, hospitals, and public-private partnership projects.

### 2. Final Tax

Final taxes refer to the full and final payment of income taxes on selected types of income, such as interest income, dividends, rents, royalties, premiums, annuities, emoluments, and capital gains. Final taxes are withheld at source and are not creditable against the income tax due of the payee.

The final tax rates differ depending on type of income. Dividends received from domestic corporations are tax-exempt. Interest income from any peso bank deposit, and yield or any other monetary benefit from deposit substitutes and from trust funds and similar arrangements, are levied a 20 percent tax.

Meanwhile, interest income received from a depository bank under the Foreign Currency Denominated system is taxed at 7.5 percent. Passive income sources such as premiums, annuities, and emoluments are subject to a 20 percent tax.

A capital gains tax (CGT) of 6 percent is a final tax imposed on capital gains presumed to have been realized from the sale, exchange, or other disposition of real property located in the Philippines and classified as capital assets. A 5 percent CGT is also imposed on the net capital gains from the sale of shares of stock in a domestic corporation not traded in the stock exchange. For those sales of shares of stock through the exchange, the applicable CGT rate is one half of one percent of the selling price.

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ii Other CIT exempt sectors are: beneficiary associations operating for the benefit of the members, such as fraternal organizations; cemeteries that are company-owned and operated exclusively for the benefit of its members; non-stock corporations organized and operated exclusively for religious, charitable, scientific, athletic, or cultural purpose, or for the rehabilitation of veterans; business leagues, chambers of commerce, or boards of trade not organized for profit; civic leagues or organizations operated exclusively for the promotion of social welfare; non-stock, non-profit educational institutions; government educational institutions; organizations of local character with income from the fees of members for the sole purpose of meeting expenses; and farmers, fruit growers, or similar associations organized for marketing the products of their members.



### 3. Value-Added Tax

Value-added tax (VAT) is a consumption tax imposed on any sale, barter, exchange, lease of goods or properties, rendering of services, and importation of goods done in the course of trade or business. It is an indirect tax, which may be shifted or passed on to the buyer, transferee, or lessee of goods, properties, or services. A corporation is subject to a 12 percent VAT if its gross sales or receipts exceed PhP1,919,500. Entities with gross sales less than PhP1,919,500 are subject to a 3 percent tax.

A zero-rated VAT (0 percent) is imposed on export sales, foreign currency denominated sales, and sales to persons or entities whose exemptions are defined under special laws or international agreements. Input taxes attributed to zero-rated sales are creditable against output VAT.

Certain transactions are considered as VAT-exempt sales, such as the sale of agricultural or marine products in their original state; the sale or importation of fertilizers, seeds, seedlings and fingerlings; educational services rendered by private educational institutions; sales by agricultural cooperatives; sales, importation, printing, and publication of books and any newspaper, magazine, review, or bulletin that appears at regular intervals; services subject to percentage tax; services of banks; services rendered by regional or area headquarters established in the Philippines by multinational corporations that act as supervisory, communications, and coordinating centers for their affiliates; transactions that are exempt under international agreements to which the Philippines is a signatory, or under special laws; transport of passengers by international carriers; and other sales and services enumerated under the Tax Code. Input taxes attributed to exempt sales are not creditable against output VAT.

### 4. Excise Taxes

Excise taxes are imposed on the production, sale, or consumption of tobacco, alcohol, petroleum products, mineral products, and motor vehicles that are manufactured or produced in the Philippines for domestic sale or consumption or for any other disposition. Types of excise taxes include: (i) specific tax, and (ii) ad valorem tax. Specific tax is based on weight or volume capacity or any other physical unit of measurement. Ad valorem is based on the selling price or other specified value of the goods or articles.

### 5. Customs Duties

Customs duties are levied on goods imported to the Philippines. The applicable duty rate or the most-favored nation (MFN) rate depends on the



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appropriate classification of the goods under the Tariff and Customs Code of the Philippines, and generally ranges from 0 to 30 percent. Preferential rates under the Common Effective Preferential Tariff of the ASEAN Free Trade Agreement are generally lower than MFN rates.

### 6. Other National Taxes

Other taxes include: fringe benefits tax (FBT), documentary stamps tax, and percentage tax.

Fringe benefits granted to supervisory and managerial employees are subject to a 32 percent tax on the gross value of the fringe benefit.<sup>iii</sup> The documentary stamp tax (DST) is a transaction tax on selected transactions involving documents, such as loan agreements; lease agreements; original issues of shares of stocks, bonds, mortgage, insurance policies and papers; sales and transfers of the obligation, right, or property. The DST rates range from 0.15 to 12.5 percent depending on the document issued. A percentage tax is imposed on corporations not subjected to VAT. The rates imposed are based on gross receipts, and differ per industry.

Table 1 shows total collections by the BIR from firms for the period 2009 to 2014. CIT is the largest source of internal revenue taxes with a share of 34 to 37 percent in total collections. Personal income taxes account for 18 to 21 percent of total internal revenue collections.

Philippine firms are also subject to local taxes. The current governing law for local taxes is RA 7160, or the Local Government Code of 1991. The Local Government Code of 1991 intends to provide autonomy to local governments through decentralization.

Local government units impose local business taxes that are generally based on the gross sales or gross receipts of the prior year. This is usually collected when the firm renews its business permit at the start of the year. The local business tax rate varies depending on the rate imposed by the local government on the business, but generally does not exceed 3 percent.

In addition, a real property tax of 1 to 2 percent is imposed on the assessed value of real properties, such as land, building, machinery, and other improvements owned or utilized by a corporation. Transfer taxes are also imposed on the sale, donation, barter, or on any other mode of transfer of real property.

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iii The FBT helps restore equity and fairness between the managerial and rank and file employees since some benefits received by managerial employees are non-cash benefits (housing, vehicles, club memberships) and not included in their taxable income.

**Table 1. Internal Revenue Collections (in million pesos), 2009-2014**

	2009	2010	2011	2012	2013	2014
I. Taxes on Net Income and Profit	435,372 (58%)	489,300 (59%)	571,897 (62%)	642,501 (61%)	718,361 (59%)	784,756 (59%)
A. Company, corporate, enterprise	254,372 (34%)	280,044 (34%)	337,443 (37%)	370,125 (35%)	424,497 (35%)	455,099 (34%)
B. Individual	136,692 (18%)	167,110 (20%)	193,525 (21%)	222,724 (21%)	246,580 (20%)	283,589 (21%)
C. Others	44,308 (6%)	42,145 (5%)	40,930 (4%)	49,652 (5%)	47,284 (4%)	46,069 (3%)
II. Excise Taxes	60,548 (8%)	67,203 (8%)	67,993 (7%)	72,346 (7%)	118,856 (10%)	135,315 (10%)
III. Value Added	168,294 (22%)	173,284 (21%)	183,082 (20%)	229,594 (22%)	250,149 (21%)	278,793 (21%)
IV. Other Percentage Taxes	42,838 (6%)	44,510 (5%)	47,012 (5%)	52,571 (5%)	60,807 (5%)	56,489 (4%)
V. Other Taxes	43,236 (6%)	48,327 (6%)	54,162 (6%)	60,904 (6%)	68,488 (6%)	79,408 (6%)
TOTAL	750,288	822,624	924,146	1,057,916	1,216,661	1,334,762

Source: Bureau of Internal Revenue, 2009-2014

Table 2 shows an estimate of taxes collected from firms, whether by the national or local governments. Total tax collections from firms are about 9.5 to 10.4 percent of GDP.<sup>iv</sup> This range is comparable to lower middle-income countries. An IMF study indicates that in 2009, CIT revenues averaged about 2.5 percent for lower middle-income countries.<sup>10</sup>

### Fiscal Incentives

As mentioned above, certain types of firms enjoy subsidies in the form of tax holidays or reduced tax rates. These have been provided specifically to encourage foreign direct investments. There are at least six laws<sup>v</sup> that provide

iv Table 2 shows that 30 to 35 percent of all taxes paid by firms is in the form of corporate taxes.

v The following laws provide fiscal incentives: The Omnibus Investments Code of 1987 (EO 226); Bases Conversion and Development Act of 1992 (RA 7227), amended

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**Table 2. Estimated Tax Collections from Firms (in billion pesos), 2009-2014**

	2009	2010	2011	2012	2013	2014
Corporate Income Tax	254	280	337	370	424	455
Final Withholding Tax <sup>A</sup>	44	42	41	50	47	46
Value Added Tax	168	173	183	230	250	279
Excise Tax	61	67	68	72	119	135
Fees, Charges, & Royalties from Mining Firms <sup>B</sup>	0.40	0.80	1.18	1.65	1.52	3.14
Custom Duties <sup>C</sup>	220	259	265	290	305	369
Local Taxes <sup>D</sup>	32	34	40	49	49	no data
<b>TOTAL</b>	<b>781</b>	<b>856</b>	<b>936</b>	<b>1,062</b>	<b>1,197</b>	<b>1,288</b>
% of GDP	9.7%	9.5%	9.6%	10.1%	10.4%	10.2%

*Sources:* Philippine Statistics Authority, Bureau of Internal Revenue, Mines and Geosciences Bureau, and Bureau of Local Government Finance, 2009-2014.

*A* Based on BIR collection from bank deposits and tax on government securities. This is possibly overstated because reported data are inclusive of bank deposits of non-corporate accounts.

*B* Collected by the Mines and Geosciences Bureau of the Department of Environment and Natural Resources

*C* Data from Department of Finance, DOF Statistical Bulletin

*D* “Tax on Business” in the LGU’s Statement of Receipts and Expenditures. Real property taxes are excluded here.

income tax holidays for four to six years for selected industries, 5 percent preferential gross income tax rate, and tax and duty exemption on imported capital equipment. As a result of these fiscal incentives, economic zones have sprouted in various parts of the Philippines seeking tax havens for businesses. For instance, PEZA economic zone entities alone have grown from 211 in 2010 to 326 as of May 2015, with information technology (IT) parks and centers driving the increase.<sup>11</sup> In 2013, the total incentives amounted to PhP146.8 billion, which is equivalent to 1.3 percent of GDP.<sup>12</sup>

### Tax Reforms in the Philippines

The question of whether corporate income taxes should be lowered can be assessed in the historical context of reforms in the Philippines, where tax

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by RA 9400 in 2006 (including Clark Development Corporation, Poro Point Management Corporation, and Subic Bay Metropolitan Authority); the Special Economic Zone of 1995 (RA 7916), amended by RA 8748 in 1999; the Cagayan Special Economic Zone Act of 1995 (RA 7922); the Freeport Area of Bataan Act of 2009 (RA 9728); and the Regional or Area Headquarters, Regional Operating Headquarters and Regional Warehouses Act (RA 8756).

reform has been a major policy concern since the 1983-84 economic crisis.<sup>13</sup> Over the past three decades, the Philippines adopted two tax-reform programs and various legislation that reformed tax policies.

#### 1. 1986 Tax Reform Program

With the change in government in 1986, several new tax measures became effective. The unique political situation under the revolutionary government of Corazon Aquino may have contributed to the speed with which new tax measures were implemented. In addition, there was an existing package of tax measures prepared by a group of economics professors from the University of the Philippines.<sup>14</sup> The 1986 reform program included the following tax measures:

- The corporate dual rate system of 25 and 35 percent shifted to a single rate of 35 percent.
- The VAT system replaced the previous sales tax system. Under the previous system, goods were levied different rates of sales taxes, and a turnover tax of 1.5 percent of gross selling price was levied on each subsequent sale of the goods. This was replaced by the current VAT system, wherein a uniform tax rate is imposed based on the destination of the goods. The VAT rate imposed then was 10 percent, but allowed for exempt and zero-rated statuses.
- Export taxes were abolished. Previously, the export tax was levied on the gross value of taxable exports ranging from 2 to 20 percent.
- Import taxes were decreased. Prior to 1986, an ad valorem tax of 50 percent and an additional duty of 3 percent were imposed on all imports. The additional duty was phased out by 1986.
- The final tax on inter-corporate dividends and final tax on dividends were removed.

The 1986 tax reform program was successful in simplifying the tax system and raising revenues. Revenue effort increased from 10.9 percent in 1985, and peaked at 17.5 percent in 1997.<sup>15</sup>

#### 2. 1997 Comprehensive Tax Reform Program

From 1992 to 1997 there were only 10 laws that were passed to raise revenues, while 24 laws granted incentives and higher tax exemptions.<sup>16</sup> Compelled by this, another comprehensive tax-reform program (CTRP) was implemented in 1997. At that time, a tax-reform program was required by the International Monetary Fund. The Philippine government had to adopt policy measures to

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strengthen the financial system, which included a comprehensive tax reform program.<sup>17</sup>

The 1997 reform included the following tax measures:

- The CIT rate was gradually reduced from 35 to 32 percent.
- The rationalization of fiscal incentives, which was the most important aspect of the reform package, was bypassed by legislation.
- The MCIT was imposed on corporations on the fourth year after they commenced their business operations.
- A fringe benefits tax was imposed on benefits granted to supervisory and managerial services.
- A tax on dividends was restored gradually over a period of three years. A final tax was imposed on cash or property dividends actually or constructively received. Intercompany dividends remained exempt.
- The VAT base was amended to expand the coverage of the term “simple processes” by including “broiling” and “roasting.” It restored the VAT-exempt status of cooperatives, and added VAT exemptions on importation of meat, sale or importation of coal and natural gas, educational services, sales of house and lot, and printing and publication of books and newspapers.
- Taxes on the downstream oil industry and on sin products (tobacco and alcohol) were changed from ad valorem to specific taxes.
- No taxes were imposed on liquefied petroleum gas.

The approved CTRP did not adopt all the proposed measures. Observers suggested that the timing of the proposed reform was less than ideal. The presidential elections in 1998 seem to have dictated caution in passing unpopular revenue-generating laws. The rationalization of fiscal incentives was a popular call among scholars,<sup>18</sup> but was not approved. The 1997 CRTF resulted in a major decrease in revenue effort: from 17.5 percent in 1997, this dropped to 13.8 percent in 2004.<sup>19</sup>

After the 1997 tax reform program, the Philippines only had piecemeal tax reforms. In 2005, RA 9337 was passed, resulting in an increase in the VAT rate from 10 to 12 percent, and the CIT rate increased from 32 to 35 percent. Beginning in 2009, the CIT was lowered to 30 percent.

### 3. Recent Tax Reform Measures

More recent tax reform measures include increasing the basic personal exemption for individuals, excluding minimum wage earners from income tax

(both RA 9504), increasing the cap of the exemption of thirteenth month pay and other benefits from PhP30,000 to PhP82,000 (RA 10653), and increasing excise taxes of alcohol and tobacco products (RA 10351). Yet despite these numerous reform measures, scholars as well as industry observers and practitioners have pointed out deficiencies and irrationalities in the tax system. For example, some have raised the concern that the current package of fiscal incentives is redundant—that is, firms would have invested anyway, even in the absence of fiscal incentives.<sup>20</sup> In this sense, some of these fiscal incentives can be considered wasteful. More importantly, as Lim pointed out (and as borne out by Figure 2), despite these generous tax incentives, FDI did not come into the country on as massive a scale as it did into its ASEAN neighbors.<sup>21</sup>

Recently, the Tax Incentive Management Act (TIMTA), or RA No. 10708, was passed. Under TIMTA, registered business entities must file a complete annual tax incentives report with their investment promotion agencies. The reports will be submitted to the BIR, the BOC, and the Department of Finance (DOF). The DOF is in charge of maintaining a single database of these incentives. It will submit to the Department of Budget and Management (DBM) the actual amount, estimate claims, current year's programmed amount, and the following year's projected amount of tax incentives. While the monitoring will be an additional administrative burden on the part of the firms, this will enable the government to gather information crucial in analyzing the tax reforms necessary for fiscal incentives.

Philippine legislators have sought the restructuring of the corporate tax system. The move is seen to enhance the country's competitiveness, stimulate investments, improve employment, and even encourage the movement of informal businesses into the formal sector. At least seven measures<sup>vi</sup> have been filed at both the Senate and the House of Representatives during the sixteenth Congress to lower the present 30 percent corporate income tax rate to at least 25 percent.

## Methods

### Basic Model

A flexible accelerator model is employed, which assumes the following: (i) the firm is a profit maximizer, (ii) output is concave in capital stock, and

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vi Senate Bill (SB) 2163 (Angara), SB 2974 (Recto), House Bill (HB) 4099 (Gunigundo), HB 4829 (Quimbo), HB 4925 (Noel), HB 4941 (Yap), and HB 4996 (Aggabao).

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(iii) the firm is a price taker. Firms' investments at time  $t$  are proportional to desired capital stock, which is a function of expected output levels  $Q_t^*$ . Traditionally, firms are also assumed to expect future output to be a linear function of current output levels.

These assumptions imply the following basic reduced form:

$$I_t = I(\Delta Q_t, I_{t-1})$$

The "flexibility" of this version of the accelerator model allows for effects on investments of profits, uncertainty, and other variables.<sup>22</sup> Profitability ( $\pi$ ) matters for investments, particularly in the presence of credit constraints where firms use current profits to finance spending on capital.<sup>23</sup> The investment climate, which ultimately affects the access price of capital, will also matter.<sup>24</sup> This includes tax policies ( $\tau$ ) that determine the amount of resources available for investments.<sup>25</sup>

Two-year panel data on firms is used to estimate the following model of investment:

$$I_t = I(\Delta Q_t, I_{t-1}, \pi_t, \tau_t, X_t)$$

where  $X$  refers to other firm characteristics that affect investments.

In order to test the validity of the assumption on expectations of future output,  $Q_t$  and  $Q_{t-1}$ , instead of  $\Delta Q$ , are used as regressors. It can be shown that if indeed the expected future output is solely based on current output, the difference in the estimated coefficients of  $Q_t$  and  $Q_{t-1}$  should not be statistically significant. It can be further shown that if, instead, expected output level is a weighted average of current and previous output levels,

$$Q_t^* = w Q_t + (1-w) Q_{t-1}$$

where  $0 < w < 1$ , the coefficients of  $Q_t$  and  $Q_{t-1}$  need not be identical.<sup>vii</sup>

To account for this possibility, the following reduced form is employed:

$$I_t = I(Q_t, Q_{t-1}, I_{t-1}, \pi_t, \tau_t, X_t)$$

To validate the results of the cross-section analysis, further multivariate analysis was performed utilizing time series data for the Philippines from 1973 to 2014. A modified version of the model above is estimated to incorporate the presence of lags. Junankar has shown that decision, delivery, and administrative lags are important in explaining changes in investments over time.<sup>26</sup>

vii Proof available upon request.



## Cross-section Analysis

The main data source for the analysis is the Annual Survey of Philippine Business and Industry (ASPBI)<sup>viii</sup>, a nationwide survey of formally registered firms in the economy, including corporations and partnerships, cooperatives and foundations, and single proprietorships. The data from ASPBI includes a detailed breakdown of the sources of revenues, types of expenses, Philippine Standard Industrial Classification (PSIC) Code, and the amount of subsidies received by the firms.

The sampling frame of the 2010 ASPBI consists of 150,000 establishments, which is about 89 percent of all firms in the formal sector. The 2010 Census of Establishments showed that there were about 778,000 establishments in operation in the country in 2010, of which 610,000 establishments (78 percent) were classified as “informal” establishments. These were all excluded from the analysis as they are, presumably, not subject to taxation. Thus, the 2010 ASPBI covered only the following economic units: (i) all establishments with total employment of 10 and over, (ii) all establishments with total employment of less than 10, and (iii) all establishments classified as single proprietorship or single establishments regardless of total employment. The same 2010 sampling frame was used for the 2009 round.

The 2010 ASPBI sample consists of 29,298 firms (about 20 percent of the total number of firms in the sampling frame). About 73 percent of the entire sample belongs to the services sector. The distribution by industry is shown in Annex Table 1.

In this paper, the regression analyses presented are those done at the industry subclass level, using five-digit PSIC codes.<sup>ix</sup> Variations in potential tax payments across industry subclasses are thus exploited and examined as

viii An alternative data source is the website of the Securities and Exchange Commission (SEC), from which financial statements of companies can be downloaded. However, this is limited to registered corporations and does not include single proprietorships. Moreover, the information available through the SEC lacks details on subsidies, hours worked in production, and capacity utilization, all of which are needed for the computation of total potential tax burden.

ix Use of the firm-level ASPBI data is tightly regulated given the Commonwealth Act No. 591 provision that “Data furnished the Bureau of Census and Statistics (BCS) by an individual, corporation, partnership, institution or business enterprise shall not be used as evidence in any court or in any public office either as evidence against the individual, corporation, association, partnership, institution or business enterprise from whom such data emanates; nor shall such data or information be divulged to any person except authorized employees of the BCS acting in the performance of their duties; nor shall such data be published except in the form of summaries or statistical tables in which no reference to an individual, corporation, association, partnership, institution or business enterprise shall appear.”

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to whether these predict changes in investment levels, holding other industry subclass characteristics constant. Consequently, variables utilized in the regression models are industry subclass sums or averages.

### Time Series Analysis

For the supplementary time series analysis, the sources of data are the database of the Philippine Statistics Authority, the World Bank, and the Bangko Sentral ng Pilipinas. The dataset constructed covers the period 1973 to 2014, for which complete data for all the required variables were available.

The dependent variable for the model is a measure of investment: the Philippines' annual gross capital formation (GCF) in constant 2000 prices.

The main independent variable, on the other hand, is the country's historical corporate income tax rates. From 1941 to 1985, the Philippines employed a dual corporate income tax rate system; the lower tax rate is used in the regressions when applicable. Moreover, the tax rates were lagged, since changes in tax rates presumably take time to affect investment decisions.

Other independent variables include the lagged annual gross domestic product in constant 2000 prices, lagged GCF, and lagged bank average lending rates.

Using the Augmented Dickey-Fuller (ADF) test, the variables were found to be non-stationary,<sup>x</sup> or I(1). Hence, there was a need to use the first difference of the variables to mitigate spurious regression results.<sup>27</sup>

### Estimating Potential Major Tax Payments and Subsidies

The central variable of interest is potential tax payments by businesses. The available data allow the measurement of four major types of taxes: corporate income taxes, value-added taxes, final withholding taxes, and excise taxes. It was noted that these are distinct from actual tax payments, which are the de facto amounts paid to or collected by government.

The information needed to compute potential tax payments were obtained from the ASPBI's Section 12 (Compensation), Section 14 (Total Revenues) and Section 16 (Total Costs Incurred). The revenues that are subject to *corporate income taxation* include: revenues from main activity, real estate sales, insurance premiums, industrial services and non-industrial done for

x A stationary time series is one whose statistical properties such as mean, variance, or autocorrelation structure do not change over time.

others, commissions and fees earned, delivery charges separately invoiced to customers, service charges, franchise income, and other income.

*VAT payable* is computed as the difference between output and input VAT. Sales are subject to 12 percent VAT and costs are subject to 12 percent input VAT. In this study, the computation takes into account sales from exports and applied zero-rated VAT. To identify VAT exempt transactions, the industry code was applied. For PEZA-listed firms, the number of years that these had been PEZA-registered for proper application of zero-rated VAT was taken into account.

*Final withholding tax payable* is computed based on the following declared revenue items: interest income, dividend income, royalty income, and foreign exchange gains. One limitation is that certain revenue items that are subject to final withholding tax are lumped together as “other revenues” in the ASPBI. Hence, the following items could not be included in the computation of taxes: capital gains taxes on the sales of shares, and taxes on passive income such as premiums, emoluments, and annuities. It is also assumed that all interest income is subject to a 20 percent tax rate, in lieu of information on foreign currency denominated accounts (which are subject to a 7.5 percent tax rate).

*Excise taxes* are defined as actual BIR collections from selected industries for which excise taxes apply, i.e., alcohol products, tobacco products, petroleum products, miscellaneous products, and tobacco inspection fees. Excise taxes for mining and mineral products are computed based on the ASPBI data on value of products sold and materials and supplies bought by the firm. Due to data limitations, custom duties are excluded. In estimating potential tax payments, tax exemptions for industrial sectors as provided by Republic Act (RA) 8424 (Tax Reform Act of 1997) Sections 30 (Exemptions from Tax on Corporations) and 109 (Exempt Transactions from the value-added tax) were noted.

A separate variable for subsidies was generated in the form of tax exemptions and income tax holidays due to investment promotion policies. These were also deducted from the estimated potential tax payments. For purposes of accounting for total tax exemptions and holidays, ASPBI data was supplemented with data on fiscal incentives obtained from the Board of Investments (BOI), Philippine Economic Zone Authority (PEZA), Cagayan Economic Zone Authority (CEZA), and Authority of the Freeport Area of Bataan (AFAB). In 2013, these investment promotion agencies (IPAs) accounted for PhP135.7 billion of investment tax expenditures.<sup>xi</sup> For purposes of the regression analyses, however, only PEZA

<sup>xi</sup> The tax incentives provided by the following IPAs are not yet included in the analysis: Clark Development Corporation, Poro Point

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incentives were included. The level of detail provided by the PEZA master list allowed merging with the ASPBI data at the subclass level (five-digit PSIC).<sup>xii</sup> It was further noted that PEZA incentives vary over time: In the first five years, firms enjoy a full income tax holiday, but without VAT exemption. Beyond five years, firms are given VAT and FWT exemption, and face a 5 percent tax rate on gross income. For each of the firms registered in the PEZA roster, taxes payable were estimated and the relevant subsidies were applied, depending on the age of the firm.

The tax variable, *tax rate*, is defined as the sum of the major business taxes—corporate income tax, VAT, final withholding tax, and excise tax—that are payable or due as a proportion of total revenues. The subsidy variable (PEZA incentives) is expressed in peso amounts.<sup>xiii</sup>

### Measuring capital formation

For the dependent variable, we use four alternative measures of capital formation were used. The first is *capital expenditures*, defined as all tangible fixed assets acquired and for use of the establishment and expected to have a productive life of more than one year, and intangible fixed assets. Tangible fixed assets include: new tangible fixed assets, major alterations and improvements on tangible fixed assets; land and used tangible fixed assets; and tangible fixed assets produced on own account. Intangible assets include: intangible non-produced assets (e.g., patents, trademarks), computer software and databases, mineral exploration (for mining establishments only), entertainment, literary and artistic originals, and others. This is similar to the OECD definition of gross fixed capital formation, which is classified as the acquisition—less disposals—of tangible and intangible fixed assets, plus major improvements to, and transfer costs on, land and other non-produced assets.<sup>28</sup> The second

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Management Corporation, and Subic Bay Metropolitan Authority.

xii The study recognizes that PEZA companies may not be accurately classified according to their appropriate PSIC codes. Consider the scenario that Company 1 has two lines of businesses: Line A and Line B. Line A is subjected to regular CIT (30 percent) while Line B has PEZA incentives. Company A files one tax return for both lines of businesses. Line A figures are under regular corporate tax rate, and Line B figures are under the special rate (0 percent because of PEZA). The company files its tax return under the default PSIC code (Line A), and the code of the Line B business is not reflected in the tax return. For example, the main business is food manufacturing, but the company has a business line that packages the food it processes and has obtained an incentive for that (packaging used to be a prioritized business activity). Some companies, however, use separate small subsidiaries that are different entities to handle their Line B. There is no “approach” or “monitoring entity” that distinguishes this.

xiii The detailed estimation methodology is available upon request.

measure is value of *new tangible assets*, as defined above. The third measure is *research and development expenditures* as reported by firms. A fourth measure is *number of new firms* within an industry subclass, defined as the additional number of establishments from 2009 to 2010.

### Other regressors

To proxy for expected scale of business activity, the change in total revenues—defined as cash received by the firms, including receivables, for products sold and for services rendered from 2009 to 2010—was used.

The lagged values of capital formation, as the accelerator model implies, indicates the timing of investments, or whether or not planned capital stocks are achieved within one year.

Profit rate is defined as the difference between total revenues and total expenditures, as a proportion of total revenues.

Complementarities between capital and labor were assumed, and thus total employment (in logarithms)—defined as the number of persons who worked for the establishment—was also include as a regressor. In the 2010 ASPBI sample, the average number of workers in each firm was 101.

Concentration ratios (defined as the market share of the top four firms to the total revenue generated by each subclass) were also included. In his seminal work, Schumpeter argued that monopolies, rather than competitive markets, offer the “stable platform” and incentives in the form of monopoly profits that promote innovation.<sup>29</sup> This argument has long been the subject of debate and empirical tests, but still no clear-cut evidence has emerged for or against the Schumpeterian view.<sup>30</sup>

Average age of the establishment accounts for the investment preferences that change over time.

Dummy variables were also added in the analysis to indicate the industry type of subclass: agriculture, forestry and fishing; mining and quarrying; manufacturing (main); electricity, gas, steam and air conditioning supply; wholesale and retail trade; repair of motor vehicles and motorcycles; information and communication; other manufacturing industries (water supply, sewage, waste management and remediation activities; and construction); and other service industries (transportation and storage; accommodation and food service activities; financial and insurance activities; real estate activities; profession, scientific, and technical activities; administrative and support

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services; private education; human health and social work activities; arts, entertainment and recreation; and other service activities). The latter industry type is used as the default industry category.

### Analyzing potential revenue implications

An important consideration in proposing any change in tax rates is the potential effect on total revenue collections by the BIR. A simple exercise was conducted using available data and parameters. It begins by computing the direct negative impact on BIR revenues (i.e., the revenue loss due to a reduction in the corporate income tax rate at the current income levels) was first computed. A possible indirect but positive impact on BIR revenues, which could arise via the investment channel, was further projected. Using the regression coefficients of the tax variable, the increase in investments resulting from a reduction in tax rates was projected.

Assuming a collection efficiency of 67 percent, the increase needed in corporate income per peso investment for the CIT collections to be revenue-neutral was computed. By comparing the direct loss with the indirect gain from a reduction in CIT, further insights were gained into whether or not proposed cuts in CIT are judicious.

## Results

### Cross-Section Analysis

Table 3 shows a breakdown of the estimate of potential major tax payments of firms in 2010. Total potential major tax payments amounted to PhP856 billion, about 7 percent of total revenues amounted to PhP9.978 trillion,<sup>xiv</sup> or 35 percent of total taxable income.

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xiv It was noted, however, that due to missing and suppressed data from the 2010 ASPBI for certain subclasses, the numbers here are possibly underestimated.



Table 3. Potential Major Tax Payments of Firms, Exemptions and Incentives, 2010

	Estimated Potential Tax Payments (in billion pesos)
Corporate income tax*	469
Final withholding tax*	145
VAT*	170
Excise tax and royalties**	72
Total potential tax payments	856
Estimated total tax exemptions****	0.17
Estimated total tax incentives*****	159
Total potential tax payments, net of tax exemptions and incentives	697
% of total revenues*	7.0%
% of taxable income	35%

\*Author's calculations using raw data from 2010 ASPBI

\*\*Author's calculations using raw data from 2010 ASPBI plus DENR-MGB collections from mining firms and BIR revenues from alcohol products, tobacco products, petroleum products, miscellaneous products, and tobacco inspection fees.

\*\*\*Actual values from Department of Finance, DOF Statistical Bulletin

\*\*\*\*Author's calculations using raw data from 2010 ASPBI. This is the estimated tax payable of firms that are exempt from paying corporate income taxes. \*\*\*\*\*Actual values were used for BOI-listed firms and AFAB-listed firms (with available data). Author's calculations for firms listed in PEZA, CEZA, and AFAB (for firms without available data on tax incentives).

Comparing the potential amount of corporate income tax payable with the actual collections of corporate income taxes by the BIR gives a rough measure of collection efficiency. Estimates in this study suggest that in 2010, only 67 percent of potential major tax payments were actually collected as corporate taxes. The reasons for this gap range from administrative difficulties in tax collection (including corrupt practices), to outright tax evasion, to tax avoidance. To the extent that some of the corporate tax payables can be avoided through legal means requiring the help of professionals who earn income from this activity, part of the gap in corporate tax payments are collected alternatively as personal income taxes paid by professionals.

Table 4 presents estimates of potential tax payments by major economic sector. Potential tax rates, defined as potential tax payments, as a share of total revenues, range from a low of 2.4 percent for the agriculture, forestry and fishing sector to a high of 7.2 percent for the services sector.



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Table 5 shows the descriptive statistics for the regression sample. There are about 683 industry subclasses covered in the various analyses. In 2010, total expenditures on capital (all types) and new tangible assets accounted for about 3 and 4 percent of total revenues, respectively. Research and development expenditures accounted for a much smaller share of total revenues (less than 1 percent). From 2009 to 2010, the average number of firms in an industry subclass dropped by about 9.

**Table 4. Potential Major Tax Payments, by industry, in billion pesos and % of total revenues**

	Number of Firms	Total Revenues (A)	Estimated Tax Burden (B)	(B)/(A)
Agriculture, Forestry and Fishing	1,516	82	2	2.4%
Industry	18,763	4,672	256*	5.5%
Services	127,835	5,224	374	7.2%

\*includes royalties and excise taxes for mining.  
Source of basic data: 2010 ASPBI

Potential major tax payments were about 6 percent of total revenues. On the average, PEZA incentives per industry subclass amounted to over PhP231 million (about 3.9 percent of total revenues for industry subclasses with at least one PEZA beneficiary). Huge variability was found in industry profitability in 2010 with a range of -146 to 99 percent. About 11 percent of all industry subclasses in the regression sample declared negative profits. The average total employment per industry subclass was about 5,700 workers, while the mean age of firms is 16 years. The average market share of the top four firms per subclass in terms of revenues is around 75 percent, with a standard deviation of 24 percent.

Tables 6 to 9 report the regression results. In general the flexible accelerator specification (Models E and F) has a better fit of the data. All models show that investments are positively correlated with current and previous output levels. That is, industry subclasses with higher current revenues have higher investments in the current year. Similarly, lower revenues in the previous period predict higher investments in the current year. Joint tests of significance on the coefficients of  $Q_t$  and  $Q_{t-1}$  as previously discussed suggest a rejection

**Table 5. Descriptive Statistics**

	Model 1 (Total Capital Expenditures)		Model 2 (New Tangible Assets)		Model 3 (R&D Expenses)		Model 4 (New Entrants)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Investments in 2010, in thousand pesos	534,285	3,010,027	386,581	2,744,944	9,405	53,312		
Number of new firms							(9)	251
Revenues in 2010, in thousand pesos	14,500,000	49,800,000	14,500,000	49,800,000	14,500,000	49,800,000	14,700,000	50,200,000
Revenues in 2009, in thousand pesos	23,300,000	71,500,000	23,300,000	71,500,000	23,300,000	71,500,000	23,800,000	72,200,000
Investments in 2009, in thousand pesos	509,056	2,621,913	334,788	1,733,407	9,575	70,531	519,709	2,648,199
Tax Rate	0.056	0.059	0.056	0.059	0.056	0.059	0.056	0.059
PEZA incentives, in thousand pesos	231,223	2,986,060	231,223	2,986,060	231,223	2,986,060	236,034	3,017,002
Profit rate	0.090	0.726	0.090	0.726	0.090	0.726	0.092	0.732
Total employment	5,608	15,924	5,608	15,924	5,608	15,924	5,574	15,711
Average age of firm	16.361	8.770	16.361	8.770	16.361	8.770	16.403	8.841
Concentration ratio (Top 4)	0.747	0.242	0.747	0.242	0.747	0.242	0.744	0.241
Agriculture, Forestry and Fishing	0.048	0.215	0.048	0.215	0.048	0.215	0.045	0.207
Mining and Quarrying	0.009	0.093	0.009	0.093	0.009	0.093	0.007	0.086
Manufacturing	0.420	0.494	0.420	0.494	0.420	0.494	0.422	0.494
Electricity, Gas, Steam and Air Conditioning Supply	0.003	0.054	0.003	0.054	0.003	0.054	0.003	0.055
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	0.217	0.412	0.217	0.412	0.217	0.412	0.221	0.415
Information and Communication	0.031	0.173	0.031	0.173	0.031	0.173	0.030	0.170
Other manufacturing industries	0.020	0.142	0.020	0.142	0.020	0.142	0.021	0.143
Number of observations	683		683		683		669	

\* The reduction in the number of observations from 942 to 669-683 in the regression sample is due primarily to the merging of PSIC codes for 2009 and 2010 and missing or suppressed values in the published ASPBI reports.

\*\*Potential tax payments include corporate income tax, final withholding tax, VAT, excise taxes (for mining industry only), and royalties (for mining industry only), net of exemptions due to statutory laws.

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of the assumption that expectations on future output levels are based solely on current output.<sup>xv</sup>

Moreover, lagged investments are significant determinants of current investments. The positive coefficients indicate that industry groups with larger investments in the previous year also have larger investments in the current year. This seems to suggest a kind of persistence in investment behavior.

Tax rates and PEZA incentives appear to influence investments in a non-linear way (refer to Models E and F).<sup>xvi</sup> Increases in tax rates (subsidies) predict lower (higher) investments. The magnitude of the effect depends on having previous (presumably ongoing) investments. This pattern was found to be true for all investment measures, with the exception of new entrants. The effect of tax rates could be substantial, at least for total capital expenditures or new tangible assets. For every percentage point increase in tax rates, the reduction in the capital expenditures and value of new tangible assets in industries is estimated at 6.1 and 7.09 percent, respectively. Smaller tax effects are found on research and development expenditures (Model E, 1.9 percent). On the other hand, from the model of new entrants, tax rates do not appear to impact on the decision to start a business (thereby increasing the number of firms in an industry).

From Model E, industry groups with larger PEZA incentives, on the average, have larger investment expenditures. A PhP1,000 increase in PEZA incentives is associated with a PhP434 to PhP865 increase in investments. Model F, however, seems to suggest that there is scope for rationalizing incentives or choosing to grant incentives to the sectors that are putting these resources in productive use. Significant and positive coefficients of the PEZA variable interacted with industry dummy variable, for example, provide empirical basis for supporting the manufacturing, and information and communication sectors by way of fiscal incentives. Further research can be conducted to validate these findings, possibly with new data made available through TIMTA.

Increased fiscal incentives were also found to predict a rise in the number of firms in the following industry subclasses: (i) wholesale and retail trade; (ii) information and communication; and (iii) water supply, sewage, waste management, and construction. This is noteworthy considering that on average there was a decline in the number of firms from 2009 to 2010 across all industries.

xv Details available upon request.

xvi Regressions using an alternative definition of tax rates (net of VAT) yielded similar results. Details available upon request.

Age, meanwhile, is positively correlated with the level of R&D expenditures of firms. While some studies present contrasting evidence<sup>31</sup>, the positive influence of age is consistent with the liability of newness concept.<sup>32</sup> Rafiq, Salim, and Smyth conclude that newer or younger firms have yet to have the experience and the time to build ties with creditors, customers, as well as research institutions to further facilitate R&D spending.<sup>33</sup> Kane, Ubilava, and Xu provide evidence that older firms do spend more on R&D than younger firms.<sup>34</sup>

Total employment (in logarithms) and profit rates are not significant determinants of investments in all models. Using Model D for new tangible assets, it was found that increased market concentration predicts larger firm investments. This is in line with the predictions of Schumpeter. Adding industry dummy variables, however, seems to dampen this correlation. As suggested earlier, consensus on this link is elusive.<sup>xvii</sup> Further research is needed to robustly identify the competition-innovation nexus, at least in the Philippine context.

### Time Series Analysis

The results of the time series regressions are consistent with the results of the cross-section analysis previously discussed. Higher corporate income tax rates negatively impact on investments at the 5 percent significance level.

In particular, the full model indicates that a one percentage point increase in statutory corporate tax rates from the previous year predicts a PhP22 billion decrease in the country's GCF. This is roughly 0.6 percent of average GDP and 3 percent of average GCF from 1973-2014. To further highlight the significance of the predicted decrease, the average annual rise in GCF is PhP29 billion for the same time period.

Figure 5 shows the model's predicted 2014 GCF if changes were introduced in the corporate tax rate starting in 2013. If the rate remained at 30 percent, the model predicts a PhP1.51 trillion GCF, which is similar to the actual GCF in 2014. Regression tables are presented in Annex 3 and 4.

xvii Cohen's review (2010) of the empirical research points to a positive relationship between market concentration and investments, particularly in the form of R&D, providing confirmation to the predictions of Schumpeter (1942). Some studies show that market concentration predicts reduced investments (Ruiz-Porrás and Lopez-Mateo 2010; Aiello and Castiglione 2013). Other empirical studies reveal an inverted U relationship between market concentration and investments. Akdogu and MacKay (2008) attribute this to the strategic role of investments for firms in mid-concentration industries by way of posturing to prevent new entrants, to induce rivals to give up market share, or to cause them to exit the industry.

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**Table 6. OLS Estimates of Capital Expenditures**

	Model 1A		Model 1B		Model 1C		Model 1D		Model 1E		Model 1F	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Total Capital Expenditures in 2010, in thousand pesos (Y)												
Revenues in 2010, in thousand pesos	0.049	13.760*	0.044	11.380*	0.039	9.510*	0.035	8.650*	0.045	9.810*	0.057	15.620*
Revenues in 2009, in thousand pesos	-0.013	-5.270*	-0.012	-4.720*	-0.011	-4.250*	-0.011	-4.400*	-0.014	-5.130*	-0.015	-8.020*
Investments in 2009, in thousand pesos					0.388	4.500*	0.401	4.640*	0.357	4.170*	0.332	6.080*
Tax Rate			(1,206,089)	-0.780	(362,099)	-0.230	(662,681)	-0.420	(2,205,962)	-1.290	(2,602,555)	-2.450*
Tax rate* lagged investments					-1.849	-3.630*	-1.874	-3.700*	-1.866	-3.740*	-1.337	-4.240*
PEZA incentives, in thousand pesos	0.183	5.370*	0.081	1.970*	0.081	1.970*	0.976	5.060*	0.886	4.670*	-0.327	-1.020
PEZA incentives* lagged investments					0.000	-4.750*	0.000	-4.400*	0.000	-4.400*	0.000	-2.250*
Profit rate	1,515	0.100	953	0.070	(269)	-0.020	414	0.030	1,464	0.170		
Log (Total employment)			240,409	2.750*	180,296	2.090*	(44,312)	-0.820				
Average age of firm			(7,636)	-0.730	1,123,170	1.940	977,349	1.650	(197,167)	-0.540		
Concentration ratio (Top 4)												
Agriculture, Forestry and Fishing							(133,964)	-0.290	(71,856)	-0.260		
Mining and Quarrying							2,535,564	2.680*	2,775,343	4.740*		
Manufacturing							(342,298)	-1.370	(226,289)	-1.460		
Electricity, Gas, Steam and Air Conditioning Supply							(8,763,787)	-4.550*	931,123	0.670		
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles							(130,894)	-0.450	(242,486)	-1.330		
Information and Communication							2,398,375	4.490*	(129,301)	-0.380		

**Table 6. OLS Estimates of Capital Expenditures**

Total Capital Expenditures in 2010, in thousand pesos (Y)	Model 1A		Model 1B		Model 1C		Model 1D		Model 1E		Model 1F	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Other manufacturing industries									(653,438)	-1.020	(340,733)	-0.830
Manufacturing* PEZA incentives											0.657	1.970*
Electricity, Gas, Steam and Air Conditioning Supply*PEZA incentives											-3.111	-6.490*
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles*PEZA incentives											17.687	0.320
Information and Communication* PEZA incentives											22.380	28.430*
Other manufacturing industries*PEZA incentives											0.017	0.040
<b>Constant</b>	<b>114,481</b>	<b>1.250</b>	<b>205,339</b>	<b>1.570</b>	<b>106,211</b>	<b>0.810</b>	<b>(2,316,644)</b>	<b>-2.350</b>	<b>(1,685,759)</b>	<b>-1.690</b>	<b>679,938</b>	<b>1.090</b>
<b>R-squared</b>	<b>0.326</b>		<b>0.351</b>			<b>0.368</b>		<b>0.396</b>		<b>0.439</b>		<b>0.785</b>
Total marginal effect of tax rates, in thousand pesos												
As % of average (Y)												
Total marginal effect of PEZA incentive, in thousand pesos												
<b>Marginal effect of PEZA per industry, in thousand pesos</b>												
Manufacturing												
Electricity, Gas, Steam and Air Conditioning Supply												
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles												
Information and Communication												
Other manufacturing industries												

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**Table 7. OLS Estimates of New Tangible Assets**

	Model2A		Model2B		Model2C		Model2D		Model2E		Model2F	
Expenditures in New Tangible Assets in 2010 in thousand pesos (Y)	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Revenues in 2010, in thousand pesos	0.042	12.290*	0.037	10.000*	0.035	9.070*	0.032	7.970*	0.040	8.930*	0.047	13.900*
Revenues in 2009, in thousand pesos	-0.013	-5.480*	-0.012	-4.940*	-0.012	-4.750*	-0.011	-4.570*	-0.014	-5.200*	-0.013	-7.520*
Investments in 2009, in thousand pesos					0.399	4.090*	0.406	4.090*	0.390	3.970*	0.351	5.820*
Tax Rate			(1,702,922)	-1.150	(810,864)	-0.540	(772,529)	-0.500	(1,955,448)	-1.170	(2,600,742)	-2.560*
Tax rate* lagged investments					-2.441	-3.190*	-2.540	-3.320*	-2.701	-3.570*	-1.374	-2.960*
PEZA incentives, in thousand pesos	0.187	5.730*			0.077	1.830	0.457	2.390*	0.441	2.350*	-0.782	-2.570*
PEZA incentives* lagged investments							0.000	-2.050*	0.000	-2.060*	0.000	-0.170
Profit rate	1,384	0.100			902	0.070	6	0.000	593	0.040	1,713	0.210
Log (Total employment)					238,375	2.820*	178,199	2.120*	(43,337)	2.120*	(43,337)	-0.840
Average age of firm					(9,292)	-0.910	(5,728)	-0.560	(4,350)	-0.560	(4,350)	-0.700
Concentration ratio (Top 4)			1,288.824	2.290*	1,104.777	1.910*	(89,026)	1,288.824	2.290*	1,104.777	(89,026)	-0.250
Agriculture, Forestry and Fishing					(43,343)	-0.100	(28,011)	(43,343)	-0.100	(28,011)	(43,343)	-0.100
Mining and Quarrying					1,577,713	1.700	1,813,237	1,577,713	1.700	1,813,237	1,577,713	3.240*
Manufacturing					(216,949)	-0.890	(147,629)	(216,949)	-0.890	(147,629)	(216,949)	-1.000
Electricity, Gas, Steam and Air Conditioning Supply					(7,612,768)	-4.080*	551,832	(7,612,768)	-4.080*	551,832	(7,612,768)	0.410
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles					(15,422)	-0.050	(174,705)	(15,422)	-0.050	(174,705)	(15,422)	-1.010
Information and Communication					2,567,123	4.940*	(28,550)	2,567,123	4.940*	(28,550)	2,567,123	-0.090



**Table 7. OLS Estimates of New Tangible Assets**

Expenditures in New Tangible Assets in 2010 in thousand pesos (Y)	ModelZA		Model2B		Model2C		Model2D		Model2E		Model2F			
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat		
Other manufacturing industries											(604,255)	-0.950	(623,679)	-1.570
Manufacturing* PEZA incentives													0.848	2.630*
Electricity, Gas, Steam and Air Conditioning Supply*PEZA incentives													-2.131	-4.820*
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles*PEZA incentives													18.081	0.350
Information and Communication* PEZA incentives													22.943	30.710*
Other manufacturing industries*PEZA incentives													0.613	1.450
<b>Constant</b>	<b>72,325</b>	<b>0.820</b>	<b>187,463</b>	<b>1.500</b>	<b>102,216</b>	<b>0.810</b>	<b>(2,407,625)</b>	<b>-2.530</b>	<b>(1,839,098)</b>	<b>-1.890</b>	<b>577,934</b>	<b>-1.890</b>	<b>577,934</b>	<b>0.970</b>
<b>R-squared</b>	<b>0.254</b>	<b>0.287</b>				<b>0.302</b>		<b>0.313</b>			<b>0.356</b>			<b>0.765</b>
Total marginal effect of tax rates, in thousand pesos		<b>0.000</b>				<b>(8,172)</b>		<b>(8,502)</b>		<b>(9,042)</b>		<b>(30,606)</b>		
As % of average (Y)		<b>0.0%</b>				<b>-2.1%</b>		<b>-2.2%</b>		<b>-2.3%</b>		<b>-7.9%</b>		
Total marginal effect of PEZA incentive, in thousand pesos		<b>0.187</b>				<b>0.000</b>		<b>0.450</b>		<b>0.434</b>				
<b>Marginal effect of PEZA per industry, in thousand pesos</b>														
Manufacturing													<b>0.066</b>	
Electricity, Gas, Steam and Air Conditioning Supply													<b>-2.913</b>	
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles													<b>-0.782</b>	
Information and Communication													<b>22.161</b>	
Other manufacturing industries													<b>-0.782</b>	

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**Table 8. OLS Estimates of R&D Expenditures**

	Model 3A		Model 3B		Model 3C		Model 3D		Model 3E		Model 3F	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
R&D Expenditures in 2010, in thousand pesos (Y)												
Revenues in 2010, in thousand pesos	0.0006	7.950	0.0005	6.350	0.00013	2.400	0.00013	2.440	0.00002	3.200	0.00004	5.310
Revenues in 2009, in thousand pesos	(0.0001)	-2.520	(0.0001)	-2.140	-0.00004	-1.020	(0.00002)	-0.620	(0.00004)	-1.150	(0.0001)	-3.070
Investments in 2009, in thousand pesos												
Tax Rate			(7,584)	-0.240	0.548	23.450	0.745	17.160	0.729	16.530	0.684	15.190
Tax rate* lagged investments					1.711	2.540	-2.237	-2.360	-1.886	-1.960	-0.901	-0.910
PEZA incentives, in thousand pesos	0.002	3.450	0.000	-0.790	0.000	0.000	0.760	0.000	0.590	-0.009	-0.009	-1.310
PEZA incentives* lagged investments												
Profit rate			42	0.140	19	0.100	(10)	-0.050	(29)	-0.150	(18)	-0.100
Log (Total employment)							2,126	1.840	1,894	1.590	972	0.800
Average age of firm							384	2.680	390	2.650	332	2.270
Concentration ratio (Top 4)							15,508	2.030	16,263	2.000	12,183	1.490
Agriculture, Forestry and Fishing								(4,548)	-0.720	(3,836)	-0.610	
Mining and Quarrying								(9,753)	-0.740	(9,593)	-0.730	
Manufacturing								(2,695)	-0.780	(2,653)	-0.770	
Electricity, Gas, Steam and Air Conditioning Supply								(68,330)	-2.500	(7,892)	-0.250	
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles								(1,076)	-0.260	(709)	-0.170	
Information and Communication								616	0.080	1,302	0.170	
Other manufacturing industries								854	0.100	1,362	0.150	

**Table 8. OLS Estimates of R&D Expenditures**

R&D Expenditures in 2010, in thousand pesos (Y)	Model 3A		Model 3B		Model 3C		Model 3D		Model 3E		Model 3F	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Manufacturing* PEZA incentives											0.009	1.310
Electricity, Gas, Steam and Air Conditioning Supply*PEZA incentives											-0.025	-2.430
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles*PEZA incentives											0.241	0.200
Information and Communication* PEZA incentives											-0.014	-0.810
Other manufacturing industries*PEZA incentives											0.004	0.440
Constant	3,788	2.080	4,724	1.800	1,129	0.650	(32,941)	-2.540	(30,085)	-2.190	(19,787)	-1.420
R-squared	0.154		0.164		0.632		0.652		0.652		0.652	
Total marginal effect of tax rates					0.000		164		(214)		(181)	
Total marginal effect of PEZA incentive					0.0%		1.7%		-2.3%		-1.9%	
Marginal effect of PEZA per industry, in thousand pesos												
Manufacturing											-0.0001	
Electricity, Gas, Steam and Air Conditioning Supply											-0.0250	
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles											-0.0001	
Information and Communication											-0.0001	
Other manufacturing industries											-0.0001	

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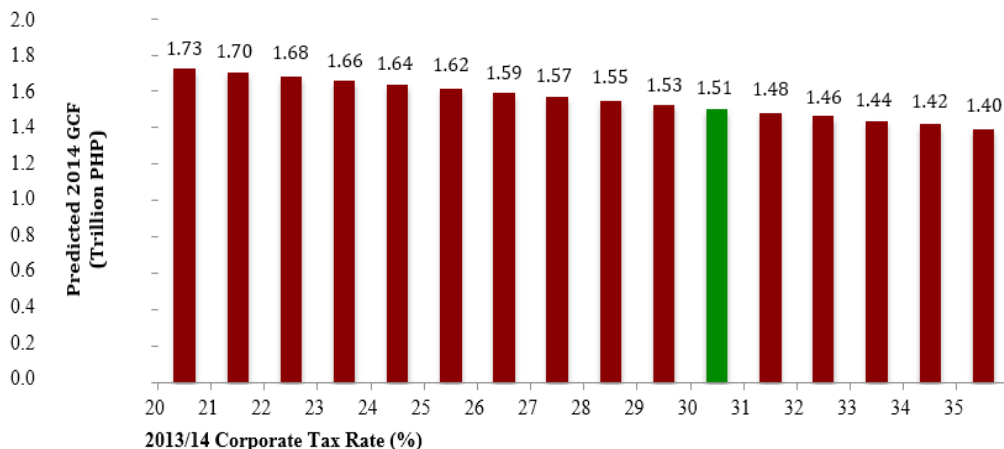
**Table 9. OLS Estimates of New Industry Entrants**

	Model4A		Model4B		Model4C		Model4D		Model4E		Model4F	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
New Industry Entrants (Y)												
Revenues in 2010, in thousand pesos	0.0000004	0.980	0.0000004	0.990	0.0000007	1.710	0.0000007	1.630	0.0000010	1.850	0.0000015	2.180
Revenues in 2009, in thousand pesos	-0.0000003	-1.020	-0.0000003	-1.060	-0.0000004	-1.350	-0.0000003	-1.240	-0.0000005	-1.490	-0.0000006	-1.720
Investments in 2009, in thousand pesos					-0.0000197	-2.170	-0.0000178	-1.900	-0.0000185	-1.920	-0.0000241	-2.420
Tax Rate		(98)		-0.590	(129)	-0.760	(140)	-0.820	(70)	-0.360	(52)	-0.270
Tax rate* lagged investments					0.0000768	1.430	0.0000703	1.290	0.0000725	1.290	0.0000995	1.740
PEZA incentives, in thousand pesos			0.0000001	0.040	0.0000050	1.160	0.0000166	0.800	0.0000129	0.610	0.0001506	2.600
PEZA incentives* lagged investments												
Profit rate			0.0012243	0.000	0.0257540	0.020	0.0663519	0.050	0.0714343	0.050	0.0761888	0.050
Log (Total employment)							(8)	-0.830	(9)	-0.920	(11)	-1.090
Average age of firm							0.2138228	0.190	0.2489097	0.210	0.2495710	0.210
Concentration ratio (Top 4)							(33)	-0.520	(44)	-0.650	(48)	-0.710
Agriculture, Forestry and Fishing									23	0.430	32	0.600
Mining and Quarrying									48	0.410	56	0.490
Manufacturing									23	0.810	33	1.160
Electricity, Gas, Steam and Air Conditioning Supply									(141)	-0.650	33	0.130
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles									25	0.740	33	0.980
Information and Communication									13	0.210	21	0.330

**Table 9. OLS Estimates of New Industry Entrants**

	Model4A		Model4B		Model4C		Model4D		Model4E		Model4F	
New Industry Entrants (Y)	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Other manufacturing industries					48	0.660			65	0.880		
Manufacturing* PEZA incentives									-0.0001613	-2.670		
Electricity, Gas, Steam and Air Conditioning Supply*PEZA incentives									-0.0002423	-2.790		
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles*PEZA incentives									0.0005165	0.050		
Information and Communication* PEZA incentives									-0.0001855	-1.300		
Other manufacturing industries*PEZA incentives									-0.0001568	-1.950		
Constant	(8)	-0.800	(3)	-0.190	2	0.130	79	0.740	73	0.640	79	0.690
R-squared	0.154		0.002		0.010		0.012		0.014		0.028	
Total marginal effect of tax rates					0	0	0	0	0	0	0	0
Total marginal effect of PEZA incentive									0.0000014	0	0	0
<b>Marginal effect of PEZA per industry, in thousand pesos</b>												
Manufacturing											-0.00001	
Electricity, Gas, Steam and Air Conditioning Supply											-0.00009	
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles											0.00015	
Information and Communication											0.00015	
Other manufacturing industries											0.00015	

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**Figure 5. Predicted GCF vis-à-vis Different Corporate Tax Rates, 2014**

*Source:* Author's calculations

*Source of basic data:* Philippine Statistics Authority, Bangko Sentral ng Pilipinas, various sources (see references)

### Possible revenue implications

Table 10 shows an illustrative computation of the revenue effects of the lowering of CIT to 25 percent.

It is estimated that for the proposed 25 percent CIT to be revenue-neutral, the net income of firms must increase by 2.1 pesos for every peso increase in investments.

While there is a direct reduction of revenues resulting from the 5 percentage point reduction in CIT, the predicted increase in CIT payable through the investment pathway is potentially sufficient to outweigh the direct revenue loss.

This study underscores the fact that these estimates are not inclusive of the revenue effects resulting from tax-induced increases in foreign direct investments that may arise, particularly with the ASEAN economic integration.

**Table 10. Estimated Revenue Changes with CIT Reduced to 25 Percent**

	In billion pesos
At current revenues, total tax potential payments of firms*	631
BIR revenue loss due to CIT reduction to 25 percent **	54.0
Increased investments of firms due to reduced taxes***	153
Increased net income from additional investments****	322
BIR revenue from additional net income (at 67% collection efficiency)*****	54.0
Estimated revenue gain	0

\*Author's calculations using reported revenues from 2010 ASPBI  
 \*\*Reducing the CIT rate by 5 percentage points will lower current CIT collections by 16.7 percent (25%/30%)  
 \*\*\*Regression results (Model 2F) show that a percentage point reduction in tax rates will lead to PhP30.6 billion increase in investments.  
 \*\*\*\*\*Applied 25 percent rate on additional net income and assumed 67 percent CIT collection efficiency rate by BIR.

### Conclusion

The results show that, in the Philippines, tax rates and incentives matter in investment decisions. Taxes and incentives can explain inter-industry variations in investment levels. The study concludes that the investment-tax and investment-subsidy relationships are non-linear: increased taxes or reduced incentives predict lower investments only for industry groups that already have previous investments.

Reduced taxes predict higher investments, with larger effects for industry groups that already have previous investments. Increased incentives predict larger investments, with the investment effects varying in size across industries. Incentives, but not taxes, can also explain changes in industry size. Potential investors in particular industries could consider available incentives as crucial in making investment decisions.

Nonetheless, the results suggest that reducing corporate income tax rates to, say, 25 percent—as some stakeholders have suggested—could bring Philippine investment levels closer to ASEAN member nations with high and growing investments, such as Indonesia, Vietnam, and Thailand. Moreover,



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the findings support current calls for the rationalization of fiscal incentives or the granting of such to industries or sectors that are able to best utilize them.

While this paper has attempted to contribute to the current debate on tax reforms in the Philippines, it emphasizes that the area of corporate taxation and subsidies is still largely under-researched. One important obstacle is the lack of data or the limited public access of available data. The government should consider intensifying efforts in collecting and analyzing firm and industry level data so that debates on taxation can be evidence-based.

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## Annexes

**Annex Table 1. Distribution of Sample Firms, by Industry, 2010 ASPBI**

2009 ASPBI	Sampled Establishments	Total Establishments	Sampled as a percentage of Total
ALL INDUSTRIES	29,298	148,266	19.76%
AGRICULTURE	811	1,536	52.80%
Agriculture, Forestry and Fishing	811	1,536	52.80%
INDUSTRY	7,049	18,836	37.42%
Mining and Quarrying	162	110	147.27%
Manufacturing	7,049	18,836	37.42%
Electricity, Gas, Steam and Air-conditioning Supply	251	231	108.66%
Water Supply, Sewage, Waste Management and Remediation Activities	238	762	31.23%

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**Annex Table 1. Distribution of Sample Firms, by Industry, 2010 ASPBI**

Construction	624	1,464	42.62%
<b>SERVICES</b>	<b>21,438</b>	<b>127,894</b>	<b>16.76%</b>
Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles, and Personal and Household Goods	8,159	57,908	14.09%
Transportation and Storage	922	2,891	31.89%
Accommodation and Food Service Activities	1,904	14,937	12.75%
Information and Communication	2,082	1,736	119.93%
Financial and Insurance Activities	1,427	14,213	10.04%
Real Estate Activities	444	2,873	15.45%
Professional, Scientific and Technical Activities	977	6,251	15.63%
Administrative and Support Service Activities	1,597	6,272	25.46%
Education	1,835	9,949	18.44%
Human Health and Social Work Activities	835	4,451	18.76%
Arts, Entertainment and Recreation	384	1,861	20.63%
Other Service Activities	872	4,552	19.16%

**Annex Table 2. Distribution of Sample Firms, by Industry, 2009 ASPBI**

2009 ASPBI	Sampled Establishments	Total Establishments	Sampled as a percentage of Total
ALL INDUSTRIES	27,575	150,196	18%
AGRICULTURE	1,268	1,567	80.92%
Agriculture, Hunting and Forestry	898	1,280	70%
Fishing	370	287	129%
INDUSTRY	7,454	20,368	36.60%
Mining and Quarrying	171	100	171%
Manufacturing	5,894	17,904	33%
Electricity, Gas and Water Supply	473	908	52%
Construction	916	1,456	63%
SERVICES	18,853	128,261	14.70%
Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles, and Personal and Household Goods	6,100	59,398	10%
Hotels and Restaurants	3,066	14,998	20%
Transportation, Storage and Communications	1,816	4,181	43%
Financial Intermediation	1,281	14,078	9%
Real Estate, Renting and Business Activities	3,238	15,118	21%
Education	1,346	9,908	14%
Health and Social Work	631	4,480	14%
Other Community, Social and Personal Service Activities	1,375	6,100	23%

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**Annex Table 3. Time Series Regressions (1973-2014): Descriptive Statistics**

Variable	Definition	Mean	SD
GDP	PH Gross domestic product (in constant 2000 prices, in million PHP)	3,394,411.00	1,483,776.00
$\log(\text{GDP})$	Natural logarithm of PH GDP	14.95	0.41
$\Delta\log(\text{GDP}_t)$	First difference of log (GDP)	0.04	0.03
$\Delta\log(\text{GDP}_{t-1})$	Lagged first difference of log (GDP)	0.04	0.03
$\Delta\log(\text{GDP}_{t-2})$	Twice lagged first difference of log (GDP)	0.04	0.03
GCF	PH Gross domestic capital formation (in constant 2000 prices, in million PHP)	742,716.70	282,374.30
$\text{GCF}_{t-1}$	First lag of GCF	723,912.00	257,886.40
$\Delta\text{GCF}_t$	First difference of GCF	29,084.44	110,937.40
$\Delta\text{GCF}_{t-1}$	Lagged first difference of GCF	29,388.18	112,333.40
Tax Rates	PH Corporate income tax rates	30.76	4.26
$\Delta\text{Tax Rates}_t$	First difference of PH corporate income tax rates	0.12	1.85
$\Delta\text{Tax Rates}_{t-1}$	Lagged first difference of PH corporate income tax rates	0.13	1.87
Interest Rates	PH Average bank lending rates (BSP)	13.74	5.50
$\Delta\text{Interest Rates}_t$	First difference of PH average bank lending rates	-0.16	3.01
$\Delta\text{Interest Rates}_{t-1}$	Lagged first difference of PH average bank lending rates	-0.16	3.05

**Annex Table 4. Time Series Regression Results (1973-2014): Dependent Variable is Annual Change in PH GCF**

	Model 1	Model 1 (Robust)	Model 2	Model 2 (Robust)	Model 3	Model 3 (Robust)	Model 4	Model 4 (Robust)	Model 5	Model 5 (Robust)
$\Delta \log(\text{GDP}_t)$	1994011****	1994011****	1772670****	1772670****	1643188****	1643188****	1521127***	1521127***	1622360****	1622360****
$\Delta \log(\text{GDP}_{t-1})$			1059979*	1059979*	1059979*	1059979*	1568509**	1568509*	1381249*	1381249
$\Delta \log(\text{GDP}_{t-2})$			-1831640***	-1831640***	-1831640***	-1831640***	-1914191***	-1914191***	-2078215***	-2078215***
$\Delta \text{GCF}_{t-1}$							-0.197644	-0.197644	-0.161066	-0.161066
$\Delta \text{Tax Rates}_t$	4888.803	4888.803								
$\Delta \text{Interest Rates}_t$	927.1375	927.1375								
$\Delta \text{Tax Rates}_{t-1}$			-13513.39*	-13513.39	-21985.94***	-21985.94***	-21913.89***	-21913.89***	-22059.21***	-22059.21***
$\Delta \text{Interest Rates}_{t-1}$			-5949.173	-5949.173	2933.140	2933.140	3033.409	3033.409	4463.374	4463.374
$\Delta \text{Tax Rates}_t^*$									0.046234	0.046234
$\Delta \text{GCF}_{t-1}$										
Constant	-45697.22	-45697.22	-37233.08	-37233.08	-4047.081	-4047.081	-9645.922	-9645.922	1365.662	1365.662
R squared	0.352980	0.352980	0.388402	0.388402	0.477948	0.477948	0.502275	0.502275	0.510577	0.510577
Adjusted R squared			0.300519	0.337435	0.398849	0.398849	0.408951	0.408951	0.400062	0.400062
No of observations	41	41	40	40	39	39	39	39	39	39
<b>Residual Diagnostics</b>										
Zero Mean?		6.92e-12		-9.09e-12		1.12e-12		5.55e-12		9.65e-12
Normally Distributed?		Yes		Yes		Yes		Yes		Yes
Serially Uncorrelated?		No		Yes		Yes		Yes		Yes
Homoskedastic?		Yes		Yes		Yes		Yes		Yes
**** 1% significance level										
*** 5% significance level										
** 10% significance level										
* 15% significance level										
For the residual diagnostics, significance level is set at 5%.										

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As briefly discussed above, time series regressions were also pursued to validate the results of the cross section regressions using the ASPBI dataset. For the time series analysis, macro variables for the Philippines from 1973 to 2014 were used. Annex Table 3 presents the descriptive statistics of the variables.

There were five regression models as shown in Annex Table 4. The models were also subject to residual diagnostics tests (Jarque-Bera statistic for normal distribution of residuals, White's Test for Heteroskedasticity, and the Breusch-Godfrey Serial Correlation LM). Robust OLS regressions were also done.

In Models 3 to 5, wherein the change in investment due to changes in output is allowed to take place over time, corporate income tax rates are found to be significant at the 5 percent level. In particular, a 1 percentage point increase in statutory corporate tax rates from the previous period predicts about a PhP22 billion decrease in the GCF. This is roughly 0.6 percent of average GDP and 3 percent of average GCF from 1973 to 2014. Moreover, the average annual rise in GCF is PhP29 billion for the same time period.

Despite the negative coefficient in the second lagged first difference of GDP, the long-run effect of output on investment is still positive. Based on Junankar (1972), this is the sum of the coefficients of  $\Delta\log(\text{GDP}_t)$ ,  $\Delta\log(\text{GDP}_{t-1})$  and  $\Delta\log(\text{GDP}_{t-2})$ . Assuming equal weights for the lag distribution, the long-run effect of output on investment is estimated to be PhP925 billion per 1 percent increase in GDP.

The lagged change in GCF is found to be negative but insignificant. According to Twine, Kiiza, and Bashaasha (2015), "Investment in the previous period can have either a positive or negative effect on current investment, depending on its magnitude, returns and the cost of adjusting the stock of capital." In addition, the lagged change in interest rates is insignificant in the models. This might indicate the lack of access or lack of importance placed by PH firms (most are MSMEs) on formal capital markets. The interaction between the corporate income tax rate and lagged investments is also insignificant.

Lastly, a co-integrating relationship was found between constant GCF and constant GDP. Future research is advised to explore the Vector Error Correction Model (VECM) specification.