

Buoyancy and Elasticity of Taxes on Net Income and Profits: CY 1998-2018*

I. INTRODUCTION

Taxes on net income and profits (NI&P) remain as top revenue source of the government, contributing on the average almost half (45 percent) to the total government tax revenues over the past two decades. As a significant source of government tax revenue, it is paramount to assess its performance and its responsiveness to the growth in national income or gross domestic product (GDP).

The commonly used tools in measuring the responsiveness of tax revenues to changes in GDP are buoyancy and elasticity estimates. Elasticity measures the responsiveness of tax revenue to changes in income also referred to as automatic growth of the tax yield. Buoyancy, on the other hand, measures the responsiveness of tax revenue to the combined effects of changes in income and of discretionary changes which include, among others, changes in tax rate and base, imposition of new taxes, and major changes in tax administration.

This paper analyzes the responsiveness of taxes on NI&P to increases in national income and to discretionary changes from 1998 to 2018. It likewise examines the revenue performance of income taxes in general. The results of the study may serve as inputs to policy makers in considering tax proposals that will have significant effects on both the taxpayers' tax burden and government revenue collections.

II. SUMMARY OF TAX MEASURES, 1998-2018

In 1998, major tax amendments were introduced by Republic Act (RA) No. 8424¹ to personal income taxation which include five percent to 34 percent graduated tax schedule for both compensation income earners and self-employed professionals. It also provided for the gradual reduction of the top marginal tax rate to 33 percent effective January 1, 1999 and to 32 percent effective January 1, 2000 and thereafter; increased in personal and additional

* Prepared by Clarence D. Moral, Statistician II and Mariane Daiseree P. Mojica, Tax Specialist I, reviewed and approved by Jonah P. Tibubos, Statistician V, Tax Statistics Branch, NTRC.

¹ Otherwise known as "The Tax Reform Act of 1997". Approved December 11, 1997.

exemptions; and reimposed a final tax on cash and/or property dividends. Eight years after, income of minimum wage earners was exempted from income tax (including holiday pay, overtime, night shift differential pay, and hazard pay) via RA 9504². In addition, it increased the personal exemption to a uniform amount of P50,000 for all individual taxpayers and additional exemption of P25,000 for each dependent, not exceeding four. The law also allowed individuals engaged in business or profession to claim optional standard deduction (OSD) equivalent to 40 percent of gross revenue in lieu of the itemized deductions. In 2015, 13th month pay and other benefits received by individuals was increased from P30,000 to P82,000 through RA 10653³.

After two decades, the personal income tax (PIT) schedule was restructured through RA 10963⁴ or the TRAIN law to address the “bracket creep” phenomenon, i.e. inflation pushing income into high tax brackets.

The law also exempted the first P250,000 annual taxable income of taxpayers; set the highest amount of taxable income at more than P8 million and subjects it to a higher marginal rate of 35 percent; repealed the provision on basic personal and additional exemptions, and premiums paid on health and/or hospitalization insurance which are deemed integrated into the P250,000 exempt threshold; retained the exemption from tax of de minimis benefits as well as the non-taxability of mandatory contributions such as those made to the GSIS, SSS, Philhealth, Pag-ibig Fund and union dues; increased the amount of tax-exempt benefits ceiling (13th month pay and other benefits) from P82,000 to P90,000; removed the preferential tax rate of 15 percent for employees of regional or area headquarters, regional operating headquarters, offshore banking units and petroleum service contractors and subcontractors; increased the fringe benefits tax (FBT) rate from 32 percent to 35 percent.

For the corporate income tax, RA 8424 introduced the two percent minimum corporate income tax (MCIT). It also gradually reduced the regular corporate income tax rate from 34 percent in 1998 to 33 percent effective January 1, 1999 and further to 32 percent effective January 1, 2000. In November 1, 2005, the rate was increased to 35 percent and then decreased to 30 percent beginning January 1, 2009 by virtue of RA 9337⁵. In 2008, RA 9504 provided for an OSD equivalent to 40 percent of gross income in lieu of the itemized deductions.

² Entitled “An Act Amending Section 22, 24, 34, 35, 51, and 79 of Republic Act No. 8424, as Amended.” Approved June 17, 2008.

³ Entitled “An Act Adjusting the 13th Month Pay and Other Benefits Ceiling Excluded from the Computation of Gross Income for Purposes of Income Taxation, Amending for the Purpose Section 32(B), Chapter VI of the National Internal Revenue Code of 1997, as Amended. Approved February 12, 2015

⁴ Entitled, “An Act Amending Sections 5, 6, 24, 25, 27, 31, 32, 33, 34, 51, 52, 56, 57, 58, 74, 79, 84, 86, 90, 91, 97, 99, 100, 101, 106, 107, 108, 109, 110, 112, 114, 116, 127, 128, 129, 145, 148, 149, 151, 155, 171, 174, 175, 177, 178, 179, 180, 181, 182, 183, 186, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 232, 236, 237, 249, 254, 264, 269, and 288; Creating New Sections 51-A, 148-A, 150-A, 150-B, 237-A, 264-A, 264-B, and 265-A; and Repealing Sections 35, 62, and 89; All Under Republic Act No. 8424, Otherwise Known as the National Internal Revenue Code of 1997, As Amended, and For Other Purposes.” Approved December 19, 2017.

⁵ Entitled “An Act Amending Sections 27, 28, 34, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 119, 121, 148, 151, 236, 237 and 288 of the National Internal Revenue Code of 1997, as Amended, and for Other Purposes”. Approved May 24, 2005.

As for other types of income, RA 8424 imposed a preferential 7.5 percent final tax on interest income from foreign currency deposits. In 2018, RA 10963 increased the tax rate on interest income from foreign currency deposits to 15 percent. The law also increased the five percent to 10 percent tax rates to a 15 percent single tax rate on net capital gains realized by individuals and domestic corporations from the sale, exchange or other disposition of shares of stock in a domestic corporation that are not traded in the local stock exchange.

III. REVENUE PERFORMANCE OF THE INCOME TAX: 1998-2018

During the period, over half (53 percent) of the total collection from taxes on NI&P came from corporations; 35 percent from individuals; and 12 percent from final withholding tax (FWT) on interest income from bank deposits and treasury bills/bonds. Tax collection from corporation includes corporate income tax and withholding tax at source while tax collection from individuals includes income taxes from compensation income earners, business/professional income earners and capital gains tax (CGT) (See Figure 1).

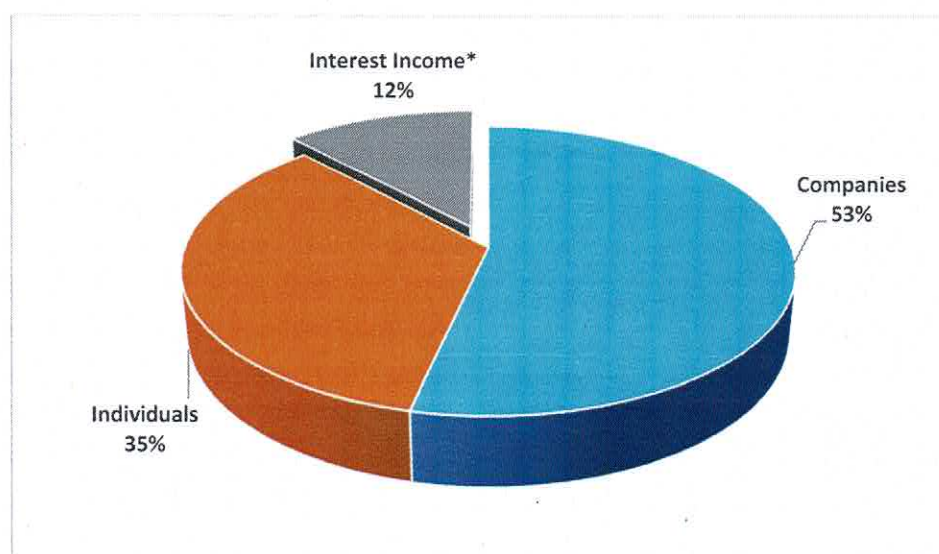


Figure 1. Average Percent Distribution of Taxes on Net Income and Profits: 1998-2018

Total tax collection on NI&P continuously grew from P183.91 billion in 1998 to P1.04 trillion in 2018, registering an annual average growth rate of 9.2 percent. The steady growth, however, was interrupted in 2009 when it posted a decrease due to a 20 percent decline in corporate income tax collection. In 2018, the aggregate collection still increased despite of the changes made to PIT by the TRAIN law.

During the period under review, the share of taxes on NI&P to GDP is estimated at 5.91 percent. (See Figure 2.)

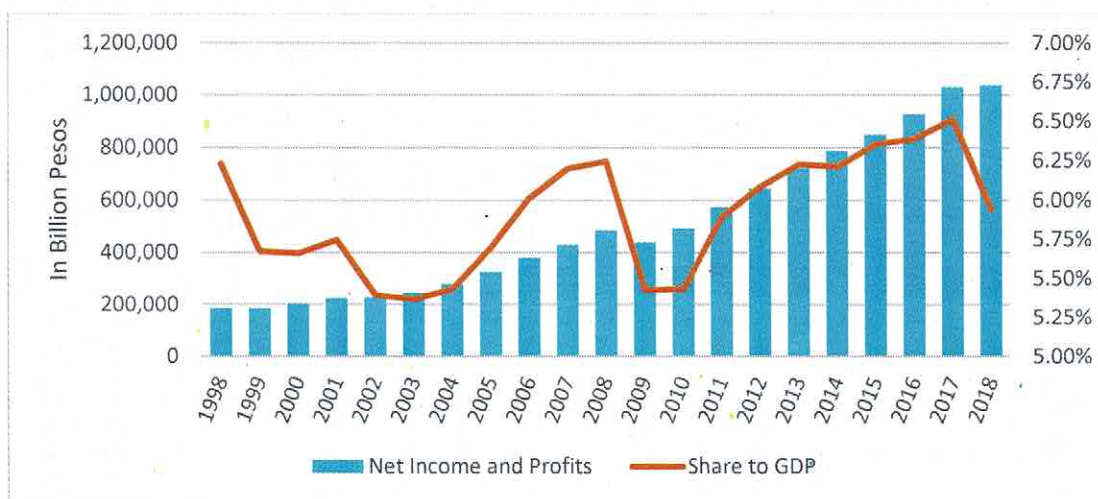


Figure 2. Total Taxes on Net Income and Profits and Share to GDP: 1998-2018

By type, corporate income tax exhibited a robust increase from P40.14 million in 1998 to P302.98 million in 2018. Starting 2003, it showed double digit increases except in 2009 when it recorded a decrease of 20 percent as mentioned above due to the reduction of the corporate income tax rate from 35 percent to 30 percent pursuant to RA 9337. Nevertheless, it still recorded a high average growth rate of 11.6 percent during the period.

Overall collection of the PIT grew from P59.23 billion to P363.79 billion. In particular, income tax on compensation grows at an average annual rate of 8.75 percent, i.e. from P48.27 billion in 1998 to P231.04 billion in 2018. However, in 2018 it recorded a 27 percent decrease due to the combined effects of the exemption of taxpayers with P250,000 annual net taxable income and increase in tax-exempt ceiling (13th month pay and other benefits) from P82,000 to P90,000.

On the other hand, business and professional income tax posted a relatively lower average growth rate of 16.9 percent due to decreases in 2001 (30.5 percent), 2002 (3.2 percent), 2006 (10.7 percent) and 2008 (0.5 percent). It should be noted that its collection increased by more than doubled from P52.23 billion in 2017 to P132.75 billion in 2018 due to the impact of the new tax schedule for self-employed and professionals.

Tax collection on capital gains of individual has been erratic from 1998 to 2009 until it continuously posted increases from 2010 to 2018. Lastly, FWT on interest income showed an up and down trend with the largest slump in 1999 (21.5 percent) and the highest increase in 2001 (32.3 percent). (See Tables 1 and 2.)

Table 1
Taxes on Net Income and Profits Collections (in Million Pesos): 1998-2018

Year	Total	Corporate Income Tax		Personal Income Tax			CGT of Individual	FWT on Interest Income
		Total	Withholding at source	Total	Compensation	Business and Profession*		
1998	183,914	77,655	40,139	37,516	59,225	48,272	10,953	42,619
1999	184,024	78,710	38,470	40,241	68,157	56,192	11,965	33,459
2000	202,636	85,871	44,140	41,731	79,506	64,040	15,466	33,761
2001	223,417	98,533	42,104	56,429	77,057	66,304	10,753	44,647
2002	226,511	100,753	44,798	55,955	82,277	71,869	10,408	39,326
2003	244,128	112,356	54,664	57,692	87,258	76,672	10,586	40,411
2004	278,214	131,168	59,677	71,491	96,699	84,290	12,409	46,126
2005	323,429	156,199	69,047	87,152	111,361	94,062	17,299	51,288
2006	376,993	199,872	96,020	103,852	121,336	105,887	15,449	50,979
2007	427,208	241,174	123,038	118,136	137,727	126,787	17,670	44,361
2008	482,248	285,269	141,957	143,312	144,367	126,787	17,580	46,042
2009	435,372	254,372	113,505	140,868	130,582	111,813	18,769	44,308
2010	489,300	280,044	120,695	159,349	159,713	135,153	24,560	42,145
2011	571,897	337,443	150,422	187,021	184,881	158,856	26,025	40,930
2012	642,501	370,125	154,743	215,383	213,271	181,625	31,646	49,652
2013	718,361	424,497	174,918	249,579	235,878	200,776	35,102	47,284
2014	784,756	455,099	187,018	268,080	271,109	232,430	38,679	46,069
2015	846,201	489,762	206,928	282,833	295,465	252,877	42,588	47,233
2016	924,585	534,359	232,791	301,568	328,488	281,550	46,938	46,366
2017	1,028,640	588,491	257,636	330,855	370,012	317,739	52,273	49,298
2018	1,035,650	592,080	302,984	289,096	363,787	231,036	132,751	57,200

* Includes withholding at source.

Source: BIR

Table 2
Growth Rate of Net income and Profits Collection: 1998-2018

Year	Total	Corporate Income Tax		Personal Income Tax			CGT of Individual	FWT on Interest Income
		Total	Withholding at source	Total	Compensation	Business and Profession		
1998-1999	0.1%	1.4%	-4.2%	7.3%	15.1%	16.4%	9.2%	-21.5%
1999-2000	10.1%	9.1%	14.7%	3.7%	16.7%	14.0%	29.3%	0.9%
2000-2001	10.3%	14.7%	-4.6%	35.2%	-3.1%	3.5%	-30.5%	32.2%
2001-2002	1.4%	2.3%	6.4%	-0.8%	6.8%	8.4%	-3.2%	-11.9%
2002-2003	7.8%	11.5%	22.0%	3.1%	6.1%	6.7%	1.7%	2.8%
2003-2004	14.0%	16.7%	9.2%	23.9%	10.8%	9.9%	17.2%	14.1%
2004-2005	16.3%	19.1%	15.7%	21.9%	15.2%	11.6%	39.4%	11.2%
2005-2006	16.6%	28.0%	39.1%	19.2%	9.0%	12.6%	-10.7%	-0.6%
2006-2007	13.3%	20.7%	28.1%	13.8%	13.5%	13.4%	14.4%	-13.0%
2007-2008	12.9%	18.3%	15.4%	21.3%	4.8%	5.6%	-0.5%	3.8%
2008-2009	-9.7%	-10.8%	-20.0%	-1.7%	-9.5%	-11.8%	6.8%	-3.8%
2009-2010	12.4%	10.1%	6.3%	13.1%	22.3%	20.9%	30.9%	-4.9%
2010-2011	16.9%	20.5%	24.6%	17.4%	15.8%	17.5%	6.0%	-2.9%
2011-2012	12.3%	9.7%	2.9%	15.2%	15.4%	14.3%	21.6%	21.3%
2012-2013	11.8%	14.7%	13.0%	15.9%	10.6%	10.5%	10.9%	-4.8%
2013-2014	9.2%	7.2%	6.9%	7.4%	14.9%	15.8%	10.2%	-2.6%
2014-2015	7.8%	7.6%	10.6%	5.5%	9.0%	8.8%	10.1%	2.5%
2015-2016	9.3%	9.1%	12.5%	6.6%	11.2%	11.3%	10.2%	-1.8%
2016-2017	11.3%	10.1%	10.7%	9.7%	12.6%	12.9%	11.4%	6.3%
2017-2018	0.7%	0.6%	17.6%	-12.6%	-1.7%	-27.3%	154.0%	16.0%
Average	9.2%	11.0%	11.4%	11.2%	9.8%	8.8%	16.9%	2.2%
							10.0%	

IV. ESTIMATION PROCEDURE

The basic data used in the calculation include actual collection from taxes on NI&P by type as reported by the Bureau of Internal Revenue (BIR), and GDP from the Philippine Statistical Authority (PSA) from 1998 to 2018.

To remove the effect of inflation, GDP and taxes on NI&P were transformed to real terms with 2000 as the base year for deflator.

Before running regression, it is important to establish the stationarity of the data series to make sure that the results obtained are not spurious. When non-stationary variables are regressed, it could lead to a spurious regression, a case wherein it could still yield a high value of R^2 indicating that the model fits well even if they are unrelated. (Brooks, 2008). A time series data is said to be stationary if its value trend reverts to its long run average and its property are not affected by the change in time. On the other hand, a non-stationary time series has its mean and variance changing over time. To examine the stationarity and order of integration of each variable, the Augmented Dickey-Fuller test was conducted.

The estimate follows the Autoregressive Distributed Lag (ARDL) model to allow flexible dynamic relationship between tax revenue and GDP. It relates tax with income in the form of the following equation:

$$\text{Ln}T_j = \sum_{n=1}^p \beta_1 \text{Ln}T_{j-n} + \sum_{n=0}^q \beta_2 \text{Ln}Y_{j-n} + \varepsilon_j$$

Where:

T_j	=	Amount of tax at the j^{th} period of year
Y_j	=	Income at the j^{th} period of year, herein represented by GDP
ε_j	=	error term

The equation suggests that developments in tax revenue can be explained by a distributed lag of order p of the dependent variable and a distributed lag of order q of GDP. Using Akaike Information Criterion (AIC), it was determined that the optimal lag value for p and q are both 1. The lagged tax variable was then subtracted from both sides of the equation and then transformed into a single Error Correction Model (ECM) of the form:

$$\Delta \text{Ln}T_j = \lambda (\text{Ln}Y_{j-1} - \text{Ln}T_{j-1}) + \beta_1 \Delta \text{Ln}Y_j + \varepsilon_j$$

where $\Delta \text{Ln}T_j = \text{Ln}T_j - \text{Ln}T_{j-1}$. The characteristic of the ECM specification relates the change in one variable to the change in another variable as well as the gap between the variables in the previous period. From the above formula, when T is taken as actual tax revenue, the coefficient β_1 is the buoyancy of tax. However, if T tax revenue is cleaned or adjusted to remove the effects of discretionary changes, β_1 becomes the estimate of income elasticity.

In cleaning the revenue series, the Dummy Variable Technique was used. This involves adding a dummy variable in the regression equation whenever there is a discretionary change. This approach simultaneously estimates the impact of discretionary changes and the built-in elasticity. It will be then added to the ARDL Model and when transformed to the ECM, it is formulated as follows:

$$\Delta \text{Ln}T_j = \lambda (\text{Ln}Y_{j-1} - \text{Ln}T_{j-1}) + \beta_1 \Delta \text{Ln}Y_j + \sum C_j D_j + \varepsilon_j$$

Where:

- D_j = discretionary changes at the j^{th} year which may either take a value of 0 (no discretionary change) or 1 (a change occurred during the period)
- C_j = impact of the discretionary change
- j = denotes the year 1, ..., n where n is the latest year in the series

To test the goodness of fit of the regression model, the level of statistics R^2 called the coefficient of the determination was computed. An R^2 of at least 0.60 is generally considered a good fit. Thus, if at least 60 percent of the variation in the tax collection is being explained by the variation in GDP, the regression model may already be considered. Another measure of a good fit is to test the significance of the computed regression coefficient. Typically, a value of less than 0.05 is considered significant.

In computing the percentage contribution of the changes in income to total tax revenue growth, the ratio of elasticity to buoyancy (e/b) was computed whereas the difference from unity of the same ratio ($1-e/b$) estimates the percentage contribution of the effects of discretionary changes.

V. STATISTICAL RESULTS

Augmented Dickey-Fuller test showed that compensation income is the only tax that is stationary at its level $I(0)$ while other remaining taxes are stationary on their first order of integration $I(1)$. (See Table 3.)

Table 3

ADF Test of Taxes on Net Income and Profits and GDP: 1998-2018

Variable	At level	P value	1 st Diff.	P value	Result
Taxes on Net Income and Profits	-2.59	0.87	-5.60	0.00 ^a	I(1)
Company, corp., enterprises	-2.28	0.95	-4.51	0.04 ^a	I(1)
Corporate	-2.86	0.20	-3.74	0.04 ^a	I(1)
Withholding at source	-1.86	0.64	-3.86	0.04 ^a	I(1)
Personal Income Tax	-3.91	0.58	-5.18	0.05 ^b	I(1)
Compensation	-5.27	0.04	-	-	I(0)
Business and Profession	-4.11	0.45	-5.77	0.00 ^a	I(1)
Capital Gains Tax of Individual	-1.80	0.67	-7.47	0.00 ^a	I(1)
FWT on Interest Income	-2.90	0.18	-5.11	0.00 ^a	I(1)
Bank Deposits	-2.85	0.20	-5.31	0.00 ^a	I(1)
Treasury Bills	-2.06	0.53	-4.08	0.02 ^a	I(1)
GDP Real	-1.39	0.83	-5.16	0.00 ^a	I(1)

Note: *a, b* denotes significance levels in 1% and 5%, respectively.

The ARDL fits the data well as the computed R^2 is high and acceptable for all types of taxes. The regression coefficients are likewise found to be statistically significant as shown by their levels of significance which are less than 0.05. The result is true for both the buoyancy and elasticity of the total taxes on NI&P and on its components.

The R^2 for total taxes on NI&P is estimated at 0.99 which indicates its strong correlation to GDP. In particular, taxes on corporation, business and profession, and treasury bills have R^2 higher than 0.80 while taxes on compensation and FWT on interest income showed a lower R^2 value but still at an acceptable level. This is consistent with many aggregate economic models where it is assumed that tax revenues are functionally related to GDP, that is, the higher the income, the higher is the expected collection.

VI. FINDINGS

The buoyancy coefficient of taxes on NI&P is estimated at 1.10 from 1998 to 2018. Removing the effects of the discretionary changes, the elasticity estimate went up to 1.38 which means that for every one percent increase in GDP, the automatic growth in NI&P is 1.38 percent. This reflects an elastic structure where NI&P grew higher relative to GDP. (See Table 4.)

Comparing the two coefficients revealed that growth in total taxes on NI&P responds well to growth in national income rather than that of discretionary changes done during the two-decade period. The tax measures implemented during the period had actually caused a decline in the overall growth of the income tax collection. As shown in Table 5, 25.5 percent of the reduction in collection on NI&P can be attributed to the revenue losing measures adopted during the period.

By type, total taxes from corporations were found to be buoyant (1.50) and elastic (1.28). It is estimated that 85 percent of its growth was attributable to the changes in income while the remaining 15 percent is to discretionary changes. In the case of the PIT, the growth in collection was attributable solely to changes in income. Both compensation income tax and business/professional income were found to be inelastic at 0.94 and 0.64, respectively. The inelastic structure of the income tax on compensation and business/professional income could be due to the failure to index the income tax schedule to inflation. The income of compensation wage earners, and self-employed and professionals were increasing during the period but the tax schedule remained at 1998 price level. It was in 2018 that this was addressed by the TRAIN law. The buoyancy and elasticity of CGT of individual was estimated at 1.70, which can be attributed to the continuous growth in the economy. Meanwhile, FWT on interest income from bank deposits and treasury bills were both found to be not buoyant and inelastic. During the period, the shares of the changes in income and discretionary changes to the growth in revenue from bank deposits were almost equal.

Table 4

Estimated Buoyancy and Elasticity of the taxes on Net Income and Profits: 1998-2018

Type of Taxes	Buoyancy Estimate			Elasticity Estimate		
	Coefficient	R ²	Sig.	Coefficient	R ²	Sig.
Taxes on Net Income and Profits	1.10	0.99	0.00	1.38	0.99	0.00
Company, corp., enterprises	1.50	0.98	0.00	1.28	0.99	0.00
Corporate	1.48	0.95	0.00	1.36	0.99	0.00
Withholding at source	1.38	0.97	0.00	1.27	0.99	0.00
Personal Income Tax	0.94	0.83	0.00	1.20	0.97	0.00
Compensation	0.90	0.99	0.00	0.94	0.99	0.00
Business and Profession	0.63	0.99	0.00	0.64	0.99	0.00
Capital Gains Tax of Individual	1.66	0.92	0.00	1.67	0.92	0.00
FWT on Interest Income	-0.36	0.65	0.02	-0.45	0.71	0.00
Bank Deposits	-1.41	0.87	0.04	-0.71	0.79	0.00
Treasury Bills	-0.39	0.98	0.00	-0.39	0.98	0.00

Table 5

Percentage Contributions of the Changes in Income and Discretionary Changes to Taxes on Net Income and Profits Growth: 1998-2018

Type of Taxes	% Contribution to Tax Revenue Growth	
	<i>Changes in Income</i>	<i>Discretionary Changes</i>
Taxes on Net Income and Profits	100.00%	-25.45%
Company, corp., enterprises	85.33%	14.67%
Corporate	91.89%	8.11%
Withholding at source	92.03%	7.97%
Personal Income Tax	100.00%	-27.66%
Compensation	100.00%	-4.68%
Business and Profession	100.00%	-0.44%
Capital Gains Tax of Individual	100.00%	-0.60%
FWT on Interest Income	100.00%	-25.00%
Bank Deposits	50.35%	49.65%
Treasury Bills	100.00%	0.00%

VII. CONCLUSION AND RECOMMENDATION

The income tax structure responds automatically to increases in the national income except for income tax on compensation and business/professional which were found to be inelastic. This can be attributed to the failure to index the income tax schedule to inflation since 1998. However, this has already been addressed with the passage of the TRAIN law in 2018.

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