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Modelling the effects of variations in corporate tax effort on revenue output in Zimbabwe.

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Abstract
From different taxation forms, corporate tax, has significantly become one of the major sources of revenue to the government. Whether the economy is shadow, enriched or booming, its government needs some revenue to promote and to lubricate its formal sector. Because of this, corporate tax at varying rates are being agreed and set by Zimbabwean government. However, less on the effects of corporate tax on revenue yields seems to be known and understood in Zimbabwe. so, our conjecture was to study the effects of varying corporate tax rate on revenue. We used the simple logistic harvesting model with varying effort coefficient. Quantitative, qualitative and geometric methods were used for model results and analysis. The research was more of theoretical with a small data set used only for validating the polynomial estimation model. Interestingly, all the methods seem to move in the same direction. The results suggest that revenue is inversely related to company tax. Lastly, we used a Lagrange polynomial to predict possible revenue output from any given corporate tax rate and we diagnosed using mean absolute percentage error which supported its use.

Keywords
Corporate tax effort, Lagrange polynomial, revenue output, simple logistic harvesting model, variations.

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Aamir M, Butt S, Hussain S, Khan KI, Nasir A, Qayyum A. Determinants of tax revenue: A comparative study of direct taxes and indirect taxes of Pakistan and India. Vol 2 No.19 (special issue-October 2011). Ausubel JH, Meyer PS. Carrying Capacity, A Model with Logistically Varying Limits. Technological Forecasting and Social Change 1999; 61:209-214. Ausubel JH, Yung JW, Meyer PS. A primer on Logistic Growth and Substitution. Technological Forecasting and social change 1999; 61:247-271. DiPrima RC, William EB (2001) Elementary Differential Equations and Boundary value problems. USA: John Wiley and sons.Inc. Dixon JM, Nassios J. Modelling the impacts of a cut in company tax in Australia. No G206 2016. Ferede, E., Dahlby, B. (2012). The impact of tax cuts on economic growth: Evidence from the Canadian provinces. National tax Journal, 65(3), 563-594 Gerald EA, Edward HR (1976). A general model for state tax revenue analysis vol 29, No 4 (1976) pp. (422-435). James S, Nobes C (2014). Economics of Taxation, ISNB.978-1906201-25-8. Jensen, M, Mathur, A, Kallen, C. (2017). Analysing the link between corporate tax, investment and GDP (online). Available at www.aei.org/publication/analysing the link between corporate tax, investment, GDP. Kalas B, Mirovic V, Andrasic J. Estimating the impacts of taxes on the economic growth in the united states (2017) 55(4):481-499. Karas, M.: Tax rate to maximize the revenue: Laffer curve for the Czech Republic. Acta univ. agric. et silvic. Mendel. Brun., 2012, LX, No. 4, pp. 189–194. Laffer, A. B., 2004: The Laffer Curve: Past, Present, and Future. [cit. 2011-10-19]. Cited from http://www.heritage.org/research/reports/2004/06/thelaffer-curve-past-present-and-future. Ndedzu, D, Macheka, M. Mavesere, I, Zivengwa, T. Revenue productivity of Zimbabwe's tax system, ISSN:2186-8492, Vol 2 No 4 (2013). OECD, (1996). Definition of taxes, DAFFE/MAI/EG2(96)3. Romer, C and Romer, D. (2010). The macro-economic effects of tax changes: estimated based on a new measure of fiscal shocks. American economic review, 100(3), 763-801. Scholes, MS.; Wolfson, MA.; Erickson, M; Maydew, EL.; and Shevlin, T (2005), "Taxes and Business Strategy, A Planning Approach," Prentice-Hall, Upper Saddle River, NJ. Suli E, Meyers D. (2003) An introduction to numerical analysis. Cape town: Cambridge university press. Suyono, E and YI, F. (2014) The

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1. Introduction.

Revenue needs have become more significant across the world due to dynamic nature of economies. Because of this, different revenue avenues have emerged so as to meet these needs. One of the interesting avenues is taxes. According to the organisation for Economic Co-operation and Development (OECD), 1996, A tax is a compulsory, unrequited payment to the general government. James and Nobes (2014), supports that a tax is a compulsory levy made by public authorities for which nothing is directly received in return. Therefore, taxes are transfers of money to the public sector but they exclude loan transactions and publicly produced goods and services. Taxes fall under two broad heads that is direct and indirect taxes. Direct taxes are those whose burden is directly born by the tax payer and contrary to these taxes is where the burden is transferred to others or public and are specially called indirect taxes, Aamir et al (2011). Direct taxes include corporate income tax, personal tax, property tax and fringe benefit tax, whereas indirect taxes include value added tax (VAT), excise duty and customs duty, all among others. We shall focus on one direct form of taxation which is corporate tax. It is the money paid by registered companies to the general public from their available profits. The government aim to harvest as more revenue from companies as possible. However, the reverse seems to be happening in Zimbabwe following different reasons. "Announcements of changes in corporate taxation often attract sizeable media attention. There are a number of potential reasons for that, but above all it is the frequency with which these changes occur. And they all seem to go in the same direction that is towards a reduction in the corporate tax burden. Recent vet prominent examples are, the United Kingdom reducing its rate from 30% to 28% for the fiscal year 2008, Germany from 33% to 27.5%" Karas(2012). This apparent pattern has triggered considerable discussions among policy makers and academicians as to whether we are experiencing tax competition which may undermine the ability of countries to tax corporate income. This seem to be not non-common in our country context where most firms are hiding in the underground economies posing an unfavourable environment for taxation. Extending this, Zimbabwe has its own mechanisms of tax regulations, rates (tax regimes) which are controlled and regulated by Zimbabwe Revenue Authority (ZIMRA). ZIMRA's responsibility is also to collect other revenue streams under the revenue authority act passed by parliament of Zimbabwe in 2002. All registered companies occupying and operating in the informal sector of Zimbabwe are obliged to pay taxes levied on them. Records from ZIMRA highlights that the lowest tax rate in Zimbabwe since 2006 was at 25% corresponding to a minimum contribution to revenue of 10%. Between 2008 and 2009 we had the highest level of corporate tax at 30,9% followed with a revenue contribution of 10% as well. This was because of failure of firm's complaints following economic hardships during that period. However, between 2006 and the first half of 2018 the average corporate tax is 27,22% and the matching average revenue contribution is 11,33%. The current company tax rate is standing at 25% with a pending revenue contribution. Practically, corporate tax presents some notable effects on Gross domestic product (GDP) of any country. Higher marginal company tax rates are often associated with low GDP levels emanating from lower investment marginal faced by firms and true otherwise, ceteris paribus. Romer and Romer (2010) emphasis the negative effect of taxes

on economic growth, where company tax and personal tax are identified as most damaging to the economy. Ferede and Dahlby (2012) used panel analysis and they found that a higher corporate tax rate is related to slower economic growth or that a 1% cut in the company tax is associated with 0.1-0.2% increase in the yearly growth rate. On the other hand, economically it is believed and known that high tax efforts are associated with high revenue outcomes though it depends on many issues such as corruption levels, number of firms adhering to the tax rules and payments among others. This paper aimed at examining any existing correlations between corporate tax and revenue output in Zimbabwe in a more of theoretical with slight empirical considerations and to provide a healthy tax estimation framework. An extended simple logistic harvesting model and three-degree Lagrange polynomial were used in meeting these aims. This harvesting model is commonly used for biological purposes and population studies and less in finance and economics (forecasting) like the one by Meyer and Ausebel (1999) and this paper took it in another interesting view. The rest of paper is as follows, literature review, methodology, data, findings, overall analysis, estimation and discussions.

2. Review of Literature.

Musgrave and Musgrave (1980) outlined that taxes, charges or borrowing fund the government expenditures. A good tax structure had attributes that included: *equitability* in the distribution of the tax burden: *minimal misallocation* of resources; facilitation of *macroeconomic stability*, and *efficiency* in administration. Mashkoor (2010) studied the relationship between tax revenues and the rate of economic growth in Pakistan. The main argument was that higher taxes decrease the investment rate, discourage research and development activities (that are key to higher productivity), reduce the work effort and distort both labour and capital markets. Using Pakistan data for the period 1973-2008, the author concluded that the direct tax to GDP ratio Granger caused the growth in real GDP significantly and recommended that the country should decrease its heavy reliance on indirect taxation. Our focus is not on taxation at large, rather it is strictly on corporate tax against revenue. In understanding why corporate taxation is such a highly contested issue, critics argue that the current tax system discourages business entities from organizing as taxable corporations and encourages corporations to veer from socially efficient decisions (Scholes et al. (2005)). Lee Young (2004) in his study of tax structure and economic emphasised on how tax policies affected a country's growth rate and he concluded that that statutory corporate tax rates are significantly negatively correlated with cross- sectional differences in average economic growth rates. In a similar study by YayaKeho (2011) on tax structure and economic growth in Cote d'Ivoire, it was established that tax variables except direct taxes and real GDP exhibit a long term and positive relationship. They further demonstrated that there was bidirectional causality between tax revenues and output in

the long run. In line with Lee Young's conclusion Zimbabwe's high tax burdens in the formal sector is resulting in the booming of informal sectors and hence a perpetuated decreasing revenue totals.

In literature the prevalent opinion holds that increasing the rate of corporate tax causes revenue to rise at first, then to fall, peaking at certain point, Laffer, (2004). On the other side, the supply-side economists believe that high marginal tax rate is inversely related to economic activeness and the rate of economic growth, thus supporting strongly the point of view to reduce marginal tax rate (Suyono, 2014). Researches on the subject were done by Ndedzu at al (2013) who said that company taxes are buoyant that is revenue is more sensitive to corporate tax changes. The estimates for company tax were (-0.3341) which was lower than for the rest tax heads. A dummy variable approach using a log linear model was proposed by Gerald et al (1976) to model state tax revenue. A linearized model and an estimation technique, third degree ordinary least squares were developed for the modelling.

Dixon and Nassios (2016) used a miniative version of the Vic-Uni computable general equilibrium model to evaluate the impact of cut in company tax rate. One of their top conclusions was that a cut in company tax attracts more investment and possibly increase revenue which concurs with Lee Young (2004). Other scholars like Kalas et al (2017) worked on the impact of taxes at large on economic growth using a multiple linear regression model. Results suggested that among all tax heads corporate tax has negative effects on economic growth with a coefficient of (-0.7200615), but it is not statistically significant. Jensen et al (2017) worked on the link between corporate tax, investment and GDP using the US data and the multifactor productivity capital tables and the investment response estimates and results showed that in the long-run the corporate income tax affects the level of GDP as summarised below.

Table 2.1. GDP effect of Corporate Tax Reforms.

Corporate Tax Reform Policy		Low Response (-1.5 semi-elasticity)			Medium Response (-3.0 semi-elasticity)		
Tax Rate	Tax Base	Increase in average growth rate, 2018-2028 (pp)	Cumulative Increase in GDP by 2028	Change in Steady-State GDP	Increase in average growth rate, 2018-2028 (pp)	Cumulative Increase in GDP by 2028	Change in Steady-State GDP
35%	Cash flow	0.04	0.45%	0.78%	0.09	0.89%	1.55%
28%	Profit	0.11	1.09%	1.90%	0.21	2.15%	3.72%
28%	Cash flow	0.14	1.44%	2.50%	0.28	2.82%	4.87%
25%	Profit	0.15	1.55%	2.68%	0.30	3.03%	5.22%
25%	Cash flow	0.18	1.85%	3.21%	0.36	3.62%	6.22%
20%	Profit	0.23	2.30%	3.97%	0.44	4.47%	7.63%
20%	Cash flow	0.25	2.54%	4.38%	0.48	4.93%	8.39%

Source: Jensen, 2017 with no additional remarks.

These results show a modest to high impact of corporate tax reform on long-run GDP, depending on the elasticity chosen. During the transition path, GDP growth rates are higher than baseline, but in the long run, only the GDP level is higher and GDP growth rates converge back to the baseline GDP growth rates, assuming higher elasticity leads to greater estimated impacts from tax reform. All these mentioned methods were indeed successful but failed to provide a specific one-one variable analysis and they were more empirical. This paper however, examines the association between corporate tax and revenue totals at wider context in case of Zimbabwe using a simple logistic harvesting model and a third-degree Lagrange polynomial(3LGP) estimation technique theoretically and empirically.

3. Methodology.

Literature suggest different methods and models used by different scholars in measuring the impacts of taxes on revenue productivity. But, linear regression models seem to be widely used. Ndedzu et al (2013) used a log linearized model to measure revenue productivity for Zimbabwe from tax heads. The model is as,

$T_t = e^{\alpha} + Y^{\beta} + e^{\varepsilon_i}$……. (1) which gives

$InT_i = \alpha_i + \beta lnY_t + \varepsilon_i$…… (2) after log transformation.

The model was used to estimate the revenue-tax buoyancy and elasticity. Other scholars such as Macek used a multiple linear regression model to evaluate the impacts of tax heads on economic growth. Also models such as error correction models from Granger theorem can be used to measure the impact of company taxes on revenue output. The simple ECM is as

$Y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_0 X_t + \beta_t X_{t-1} + \varepsilon_t$……. (3) which can be rearranged and simplified to give the increment in the response variable (revenue output) following changes in the explanatory variables (taxes such company tax). However, this paper took another angle to model revenue output sensitivity to taxes by considering company taxes only. To fully establish the effects of variations of corporate tax rates on revenue totals of Zimbabwe we used an extension of the simple logistic model similar to that used by Meyer and Ausebel (1999). The simple logistic model is denoted as,

$\frac{dR}{dt} = \delta R\left(1 - \frac{R}{K}\right)$ … …. (1),

Our extended logistic harvesting model is as below,
$\frac{dR}{dt} = \delta R\left(1 - \frac{R}{K}\right) - pR$ … … … … (2) $where,\_$

R is the revenue available at time.

δ is the net revenue growth depending on the number of companies shutting down and the incoming registered ones.

K is the maximum revenue attained by the government from its taxed companies.

p is the corporate tax effort. Our model assumes that, Revenue is in time series form, all other factors affecting revenue figures are held constant and the upper limit (K) for revenue is time independent that is it is constant.

4. Data.

We used the annual data for both corporate tax rates and the corresponding revenue contributions for the period spanning from 2009 to 2017. The data was collected from ZIMRA and there were insignificant variations with data from other agencies, like ZIMSTAT hence a true representation of the actual picture of Zimbabwean corporate tax and revenue situation. However, our corporate tax rates data appeared to be barely dispersed suggesting insignificant changes done to the tax rate over the period. We used the data in percentages for analysis and to interpolate the Lagrange polynomial.

5. Findings.

5.1. Quantitative method.

Using (2) above,

$$\frac{\mathrm{dR}}{\mathrm{dt}} = \delta \mathrm{R}\left(1 - \frac{\mathrm{R}}{\mathrm{K}}\right) - \mathrm{pR}$$

There is no such a general way of solving this kind of an equation. However, we shall restrict ourselves to some special assumptions but they will venture in during the process. **Now,**

$$\frac{dR}{dt} = \delta R - \delta R^2 - pR$$

$$\frac{dR}{dt} = R(\delta - R - p).$$

$$\frac{dR}{R(\delta - \delta R - P)} = dt$$

$$\int \left(\frac{1}{\varphi R} + \frac{\delta}{\varphi(\varphi - \delta R)}\right) dR = \int dt \quad here, \varphi = \delta - p$$

Which then results in,

$R = Ae^{\varphi t}(\varphi - \delta R)^{\delta}$,,,,,,,,,,,,,,,,,(3),Where A is an arbitrary constant.

Our solution above looks abstracted and it looks not easy to get a solution for R. So, we insert and empower our first assumption. Let δ = 1 a non-effect value, since δ is a small change in number of companies participating and shutting down and it lies in the range$0 \leq \delta \leq 1$. Then, it follows that.

$R = A\varphi e^{\varphi t} - ARe^{\varphi t}$

Finally, $R_t = \frac{A\varphi e^{\varphi t}}{(1+Ae^{\varphi t})}$,,,,,,,,,,,,,,,,(4).

But $\varphi = \delta - p$hence we have our final equation as,

$$R = \frac{A(\delta - p)e^{(\delta - p)t}}{1 + Ae^{(\delta - p)t}},,,,,,,,,,,,,,,,,,,,,(5).$$

The value of R from equation 5 at time t is the most interesting part which we shall use to evaluate the movement relationships between revenue (R) and tax effort (p).

5.2. Qualitative method.

We first find the critical and stasis points of the equation and establish their stability which we use for our analysis.

$$\frac{dR}{dt} = 0$$

$$\delta R\left(1 - \frac{R}{K}\right) - pR = 0$$

$$R_1 = 0 \; or \; R_2 = \frac{k}{\delta}(\delta - p), p \leq \delta$$

We have two solutions for the value of revenue, these two values are affected by our tax effort p except for R_1 = 0. For $R_2 = \frac{K}{r\delta}(\delta - p) \; where \; p \leq \delta$for viability. As $p \to \infty, R \to 0$ and the reversed limit order holds. Thus, suggesting the existence of an inverse relationship between corporate tax effort (p) and revenue output (R). Below is a graphical establishment of R_1andR_2.

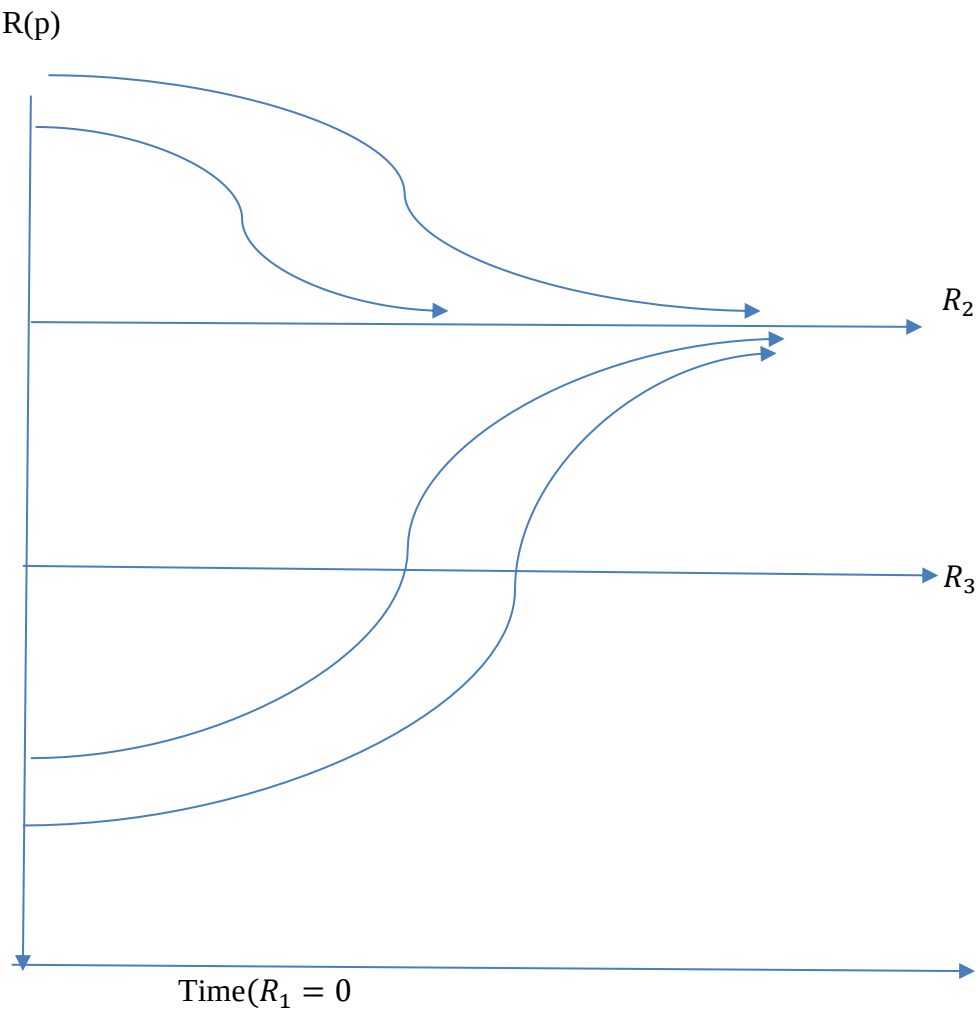

Figure5.1Stability analysis of stasis values.

From figure 5.1, *we see that the critical revenue value* $R_1 = 0$*(which is on the horizontal axis) is considered an unstable point as the trajectories are moving away from it. This means that it is not possible for the government to get no revenue.* R_3*is just an averaged revenue value which is neither stable nor unstable which helped us in our analysis. Further,* R_2 *is a stable critical revenue level since all the trajectories are approaching the point. It entails that in the long run the government will be enjoying that level of revenue ceteris paribus*.

5.3. Geometric approach.

Geometric analysis is all based on graphical reasoning and here we will be looking at changes in revenue, R following changes in the tax effort, p.

From our model, $\frac{dR}{dt} = 0$,

$$\delta R\left(1 - \frac{R}{K}\right) - pR = 0$$

$$pR = \delta R\left(1 - \frac{R}{K}\right) = R_t$$

We now use $R_t = pR \; and \; R_t = \delta R\left(1 - \frac{R}{K}\right)$to plot the effects of a varying corporate tax and revenue output. Where R_t is the resultant revenue after varying our tax effort (p) and R is the current revenue before. The function is presented graphically as below.

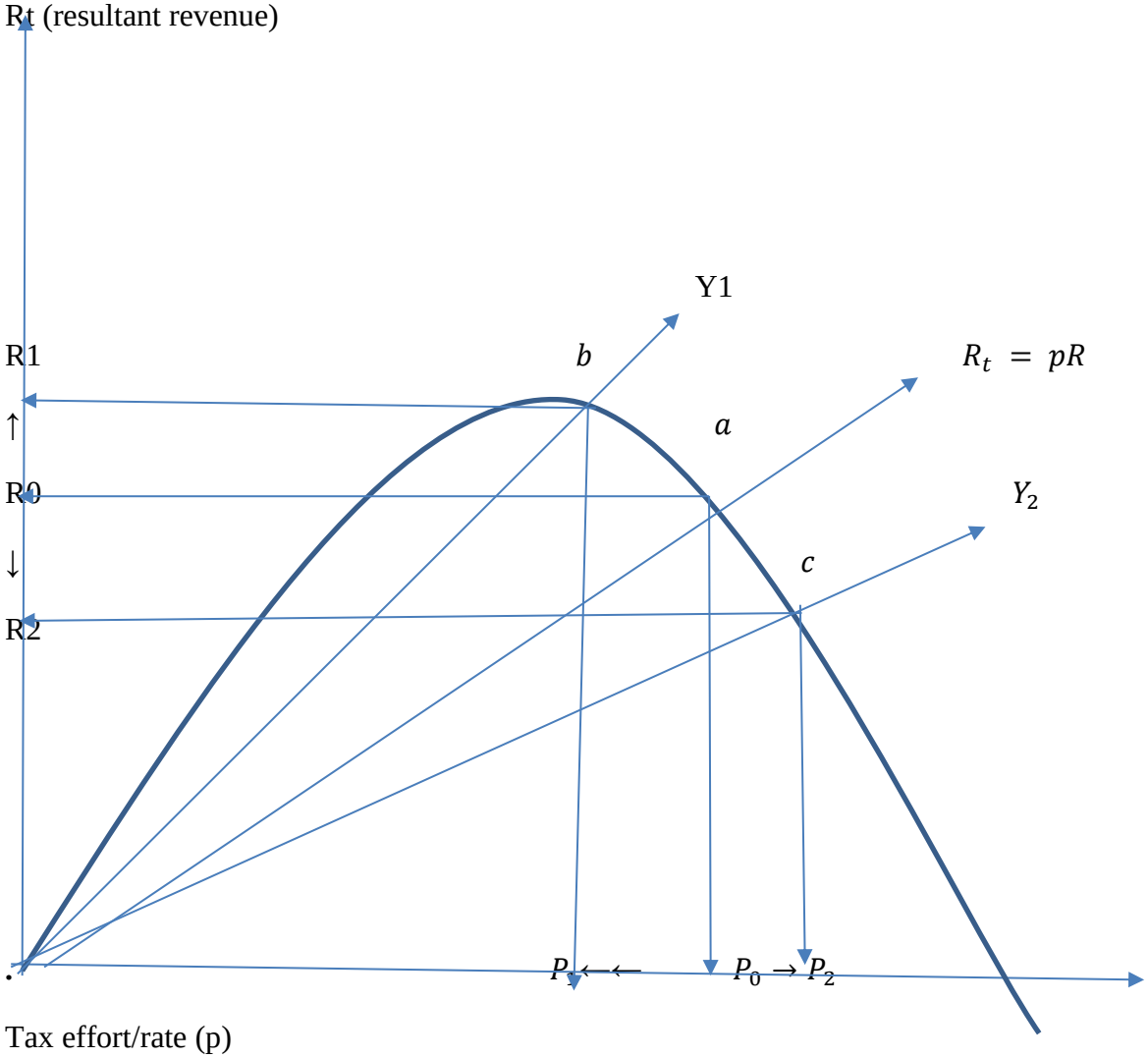

Figure 5.2: *The geometric representation of three functions, with three distinct and separate points of intersection defined uniquely and with different meanings. We have points labelled a, b and c representing revenue levels* R_0, R_1 *and* R_2*following changes in the tax effort,* P_0, P_1 *and* P_3 *respectively.* Y_1*and* Y_2*are both resultant shifts of the function* R_t *depending on the movement of company tax rate (p).* See results section below.

6. Overall analysis

Quantitatively, using our derived function for revenue, R, to determine the effects of corporate tax on revenue, we find the limit of revenue, R, as company tax rate grows larger. We used a

direct approach that is direct plug in the approached value for p. The procedure is as:

$$\lim_{p\to\infty} R$$

$$\lim_{P\to\infty} \frac{A(\delta - p)e^{(\delta-p)t}}{1 + Ae^{(\delta-p)t}}$$

$$\frac{\lim_{p\to\infty} A\infty e^{-\infty}}{1 + Ae^{-\infty}}$$

From the calculus of exponential functions, we get $\lim_{p\to\infty} \frac{0}{1+0} = 0$

Hence, as $p$increases our Revenue, R decreases.

From the qualitative approach, we have two different critical values for our revenue possibly gained by the government.$R_1 = 0$ means no revenue at all, however from the analysis it is an unstable level in the long run, indicating its impossibility. It also means that the tax rate value has no effect on that value since it is not significant. Whether the government increases or reduces the corporate tax rate, non-are the chances of getting no revenue. This is because per every 10 registered companies in the informal sector 90% of them pays the tax, except those shutting down, therefore there are no cases of getting no corporate tax revenue. Also, we have R_2 which depends sorely on the tax effort. If the government increases its tax effort, p then it is more likely to get low revenue, reasons being failure of some firms to balance off the rate and the profits possibly made. On the other hand, if it reduces the rate then more revenue is likely to be harvested as the companies will be able to manage and to handle the burden. From the analysis in fig 5.1 we deduced that R_2 is a stable point in the long term, but its stability depends on the value of p, the tax effort. It is more likely to be stable if the tax effort is kept invariant from time to time.

Geometrically, we have$a,b,$ and c as our points of intersection indicating the revenue levels to the government following the agreed corporate tax effort. R_0 is representing the revenue to the government given the initial tax rateP_0. Now if the government increases its tax effort or rate to P_2, we have an upward shift of the curve $R_t = pR$ to Y_1 intersecting at b giving a reduced revenue level from R_0 toR_2. Also, if the government reduces its tax effortto P_1we have a downward shift of the curve $R_t = pR$ to Y_2 intersecting at c giving an increased revenue level from$R_0\ to\ R_1$.

Analytically, all the approaches used on the model seem to suggest the same and tend to move in one direction. It has been shown that as p our corporate tax effort increases the revenue totals often decreases ceteris paribus.

Model limitations.

Nothing can be as good as to be totally good. Despite the ability of our model on analysing the effects of corporate tax rate on revenue the model bears a number of considerable limitations. Firstly, the model is non-linear hence estimation of parameters is not easy. The reason being the inconveniences created for the statistical applications. In addition, the model lacks coverage. It only considers one factor at time. In reality given any dependent variable, its behaviour highly depends on a number of explanatory factors. Contextually, it is not only company tax rate that determines the level of revenue disposed to the government. Tax rate can be lowered but still experiencing a lower revenue contribution. The model is based on some rigid assumptions. This means the model success in use rest on the effectiveness and validity of the assumptions used.

7. Lagrange polynomial estimation model.

We used the Lagrange polynomial to estimate the corporate tax revenue of the government in Zimbabwe. We used the polynomial of third degree. We only used a standardised sample data from 2014 to 2017, so we constructed the Lagrange polynomial of degree three to use it to estimate the future corporate tax revenue contribution. The polynomial is as follows.

Table7.1: for corporate tax rate and revenue.

P	0	10	25	20
R(p)	10	15	12	20

Here p values are representing different corporate tax rates by the government and $R(p)$ is a function representing values of the percentage revenue corresponding to the tax rate, p.

$R_n(p) = \sum R_i(p) y_i$, where $R_i(p) = \Pi_{i=0}^{3} (\frac{p-p_j}{p_i-p_j})$

$$R_0 = \frac{(p-10)(p-25)(p-20)}{(0-10)(0-25)(0-20)}$$

$$= \frac{-p^3+55p^2-950p+5000}{5000}$$

$$R_1 = \frac{(p-0)(p-25)(p-20)}{(10-0)(10-25)(10-20)}$$

$$\frac{p^3-45p^2+500p}{1500}$$

$$R_2 = \frac{(p-0)(p-10)(p-20)}{(25-0)(25-10)(25-20)}$$

$$\frac{p^3 - 30p^2 + 200p}{1875}$$

$$R_3 = \frac{(p-0)(p-10)(p-25)}{(20-0)(20-10)(20-25)}$$

$$\frac{-p^3 + 35p^2 - 250p}{1000}$$

Whence, $R_n(p) = \sum R_i(p) y_i$

$$= R_0(p)10 + R_1(p)15 + R_2(p)12 + R_3(p)20$$

$$\boldsymbol{R_n(p) = \frac{-7p^3 + 210p^2 - 775p + 12500}{1250}}$$

7.1. Polynomial validation and diagnostics.

For validation of our polynomial we used the mean absolute percentage error defined as, $MAPE = \frac{|f_i - \hat{f_i}|}{|f_i|} \times \frac{100}{n}$where n is the sampling units,f_i and $\hat{f_i}$ are for the actual and estimated revenue outputs respectively. The formula represents the distance between the actual data and the predicted. Interestingly, if the distance is less than 10 then the fit and the predicted performance is accepted. We used our collected data for the specified above period though it seems to be not normally distributed. We manually performed our predictions and as well calculate our MAPE values. See summary table below.

Table7.2: Summary of Lagrange polynomial.

Time period.	Corporate tax rate (%).	Actual revenue (%).	Estimated revenue (%).	Mean absolute percentage error (MAPE) (%).
2009	30.9	111	86.029	2.499

2010	25.75	111	90.1849	2.084
2011	25.75	111	90.1849	2.084
2012	25.75	114	90.1849	2.321
2013	25.75	112	90.1849	2.164
2014	25.75	111	90.1849	2.084
2015	25.75	112	90.1849	2.164
2016	25.75	110	90.1849	2.002
2017	25	111	88	2.302

The table above clearly shows that our (MAPE) values are all less than 10 margins of error hence suggesting that the Lagrange polynomial can be better used for prediction. However, it should not be used alone if the government is keen to make vibrant decisions implying that its significance is highly realised if fused with other techniques.

8. Discussions.

From our research, we see that revenue and corporate tax rate are inversely related. That is an increase in government corporate tax effort is associated with a fall in total corporate tax revenue contribution and true the other way. If the government want to increase the contribution of corporate tax revue to its totals, it should apply an effort that is neither too high nor too low. This is to allow companies work efficiently and to allow more firms enter the market. Therefore, we recommend the government of Zimbabwe to lower its corporate tax to the informal companies so as to boost its revenue. However, for effective fiscal return, the Zimbabwean government has also to consider other factors such as number of registered firms in the informal sector despite its shadowiness. Also, there is need to estimate first, the likely revenue to be earned, by using the Lagrange polynomial. This is helpful especially when considering the appropriate and healthy tax rate to impose. However, the tax rate should not be under set that is it should not be too low. The more healthy and reasonable company tax rate happened to be 20% which is 5% lower than that prevailing in Zimbabwe. Also, the government should not consider tax effort alone when explaining revenue falls. Other factors such as government expenditures, corruption levels, economic recessions and slowdowns, bureaucracy and inefficiency combined with imperfect information in all economic zones should not be barely considered. Further, it means that the tax rate can be lowered but still experiencing lower revenue totals. But, this paper looked at company tax effects on revenue using mathematical modelling only, implying that there is enough room for research on the subject.

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