Does increase in the depreciation expensing allowance spur economic growth? Evidence from USA

Xiaoli Yuan
Ebere A. Oriaku
Elizabeth City State University, North Carolina, USA

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Abstract

Despite substantial evidence that economic growth is influenced by taxation, the impact of Section 179 on GDP is unclear. Section 179 of the Internal Revenue Code enacted in 1958 has operated for several decades in the United States. In addition, in late 2010, two congressional acts affecting Section 179 have been passed, i.e. The Tax Relief Act of 2010 and The Small Business Jobs Act of 2010. The essence of these adoptions is to provide incentives for corporate as well as individual taxpayers. However, there are concerns as to the degree of economic growth these adoptions will provide. This research is therefore focused on showing the correlation between these Section 179 deductions, depreciation and economic growth as the Section 179 figures are debated and changed annually. The study suggests that annual increments of capital depreciation deductions will aid corporate growth as well as other variables that affect economic growth in the United States. However, the benefits for small business are lower than for corporations.

1. Introduction

Despite substantial evidence that economic growth is influenced by taxation (Sinn 1981, Baierla et al 1998, Pomerleau 2013), the U.S. Congress and Internal Revenue Service long struggled to determine the proper role of depreciation (Treasury Department study 1989). Since 2002, the two allowances under Internal Revenue Code Section 179 have been used primarily as tax incentives for stimulating the U.S. economy. There is a larger number of articles examining the economic consequence of incomplete deprecation allowance (Sinn 1981, Bartlett 2013, Hoffelder 2013). A new study of tax treatment of capital assets (depreciation expensing allowance and bonus allowance) explains that depreciation, a common accounting method used to calculate the cost of equipment and machinery in financial statements, understates the cost of the assets being acquired and results in a tax system that reduces capital—meaning it hurts the economy (Hoffelder 2013). Available evidence also suggests that the expensing allowances may have a minor effect at best on the level and composition of business investment and its allocation among industries, the distribution of the federal tax burden among different income groups, and the cost of tax compliance for smaller firms (Guenther 2015).

Though it seems that no attempt has been made to address the economic effects of the enhanced Section 179 allowances that were available from 2003 to 2014, several studies have examined the economic effects of the 30% and 50% bonus depreciation allowances from 2002 to 2004 (Cohen and Cummins 2006, House and Shapiro 2006, Knittel 2007). Their findings indicated that accelerated depreciation is a relatively ineffective tool for stimulating the overall economy during periods of weak or negative growth. One caveat is that the authors are not able to generalize findings to a long-term cycle present in capitalist economies that represents long-term, high-growth and low-growth economic periods. However, their findings focus on overall economic effects on investment, not to what extent the depreciation allowances can benefit corporate and individual taxpayers. This lack is the stimulus for the present paper.

The mixed, and perhaps counter-intuitive, empirical results could be an artifact of the empirical approach that overshadows previous studies. This research is therefore focused on showing the correlation between Section 179 deductions, depreciation and economic growth as the figures are debated upon and changed annually. Our finding suggests that annual increments of capital depreciation deductions will aid corporate growth as well as other variables that affect economic growth in the United States. However, the benefits for small business are higher than for corporations because of tax expenditure availability such as foreign income tax credit to multinationals.

This paper contributes to the stream of economic growth literature in following ways: It address time-series data from economic periods including high-growth and low-growth economic periods; the paper is not testing for the causality, but the correlation using data from 2000-2013. The remainder of the paper is organized as follows. Section 2 provides a literature review and legislative history of the expensing allowances. Section 3 describes research methodology and data source. Section 4 presents the results, while Section 5 concludes.

2. A Brief Survey of Literature and Legislative History

Literature Review on Economic Growth

One of the central questions of economics is economic growth. Per Wiki, economic growth is the increase of per capita gross domestic product (GDP) or other measures of aggregate income, typically reported as the annual rate of change in real GDP. Two different approaches are used to calculate GDP. In theory, the amount spent for goods and services should be equal to the income paid to produce the goods and services, and other costs associated with those goods and services. Calculating GDP by adding up expenditures is called the expenditure approach, and computing GDP by examining income for resources is known as the resource cost/income approach. So with the resource cost/income approach, GDP is calculated as wages, rent, interest and cash flow paid to business owners or organizers of production.

Prior study reveals various theories on economic growth, i.e., classical growth theory, neoclassical growth model, endogenous growth theory, unified growth theory, the big push, creative destruction and economic growth, useful work growth theory (Solow 1956, Swan 1956, Barro 1998, Levine 1998, Helpman 2004, Galor 2005, Ayres and Warr 2006). Barro (1998) supports the general notion of conditional convergence based on empirical findings for a panel of around 100 countries from 1960 to 1990 strongly. His paper suggests for a given starting level of real per capita GDP, the growth rate is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. Ayres and Warr (2006) identified common trends and structural changes in their book entitled Economic Growth, Technological Progress and Energy Use in The Last Century. The discussion touches on impact of annual depreciation of Section 179 on economic growth. The book imperatively argued that a consistent increase in Section 179 on annual basis will impact economic growth since it may result to growth in business investment. Galor (2005) from stagnation to Growth Unified Growth Theory emphasized on capital depreciation as a fool that will aid investors in swimming during tough economic times. He stated that capital depreciation may be significant to growth of the economy or businesses as well as private investments. In Swan Trevor's Economic growth and Capital accommodation (1956, page 334-61), he mentioned on the growth impact of bonus depreciation on businesses and individual investors. Significant impacts are mentioned but no concrete observation on specific periods. Solow (1956) made an argument about the assumptions underlying the Harrod-Domar model of economic growth in his 1956 paper. This core

assumption of the Harrod-Domar model is that of fixed proportions in production. "There is no possibility of substituting labor for capital in production" (Solow 1956, page 65). This assumption leads to Solow models of growth. McCallum, Bennett T. (1996)'s paper emphasizes that the neoclassical approach fails to provide any explanation of steady-state growth in per capita values of output and consumption, and also cannot plausibly explain actual growth differences by reference to transitional episodes. He presented and discussed three types of endogenous growth models, which attempt to provide explanations of ongoing per-capita growth. The likelihood of strictly justifying steady-state growth with these models is very small, since it would require highly special parameter values, but the models' predictions may be reasonably accurate nevertheless.

Taking survey of Neo-Classical Growth Theory and Endogenous Growth Theory, we can find following major differences: 1) Exogenous Models (Neo-classical) consider external factors to predict the economic growth. Similarly, Endogenous Model considers internal factors to predict and analyses the economic growth. 2) The Solow Model identifies the capital level per worker and the effectiveness of labor both as the ability to create permanent growth in the per capita stock per labor of the economy. While, AK Model (Endogenous) simply states that the factors of effective human capital i.e. the level of knowledge and specialization available and utilized can be determined and improved within the economy without any need to bring the technological progress. 3) The Solow Growth Model predicts only conditional convergence. However, under AK Model, it suggested that there will be no "Convergence Dynamics" towards steady state level of output or it could be slower than what Solow predicted about state of convergence in its model.

Legislative History of the Expensing Allowances

Since 1958, Section 179 of the Internal Revenue Code gives firms in all lines of business and all sizes the option, within certain limits, of expensing part or all of the cost of new and used qualified property they acquire in the year when the assets are placed in service. Business taxpayers that cannot (or choose not to) claim the allowance may recover capital costs over longer periods and at slower rates by claiming the appropriate depreciation deductions under the Modified Accelerated Cost Recovery System (MACRS) or Alternative Depreciation System (ADS). The lack of consistency on the Section 179 deduction allowance limit has raised some questions as to the incremental rationale or rationale in the decreases. Oppositions to this act centers on the rationale that achievement of the act does not justify the expenditure. Advocates of this act believe strongly that the total effect on the economy more than justifies the expenditure. The non-consensus beliefs of lawmakers on the usefulness of act have resulted in the fluctuations in the annual allowable depreciation over a few year period chosen.

Historically the Section 179 of 1958 allows businesses to completely deduct part of the cost of tangible properties in the year of purchase. However, if a business property had a life more than one year, the cost had to be deducted several years through depreciation.

Congress in addition passed the law for additional first year depreciations, and changed to bonus depreciation in the late years. The intention of course is to provide incentive for businesses and private investors with an aim of triggering economic growth. In 2003 under the job growth and Reconciliation Act, the Internal Revenue Code was expanded to benefit businesses especially small businesses. For example, the one-year deduction amount was increased from $25,000 to $100,000. The $100,000 was to be adjusted for inflation each year. In 2008 the Section 179 expensing amount increased to $250,000 in addition to 50% first year bonus depreciation. Both laws were expended to 2009 under the American Recovery and Reinvestment Act (ARRA).

Properties that qualified for Section 179 bonus depreciation must be tangible personal property actively used in taxpayer's trade or business and for which a depreciation deduction would be allowed. For Section 179, the acquired property may be new or used, however, for the bonus depreciation, the property must be new.

The allowances have advantages and disadvantages. On the one hand, congress argues that an expensing allowance simplifies tax accounting, and a temporary allowance has the potential to stimulate increased small business investment in favored assets in the short run by reducing the user cost of capital and increasing the cash flow of investing firms. On the other hand, depending on its design, an expensing allowance may interfere with the efficient allocation of capital among investment opportunities by diverting capital away from more productive uses.

3. Methodology

According to abovementioned resource cost/income approach to calculate GDP, GDP = wages + self-employment income + Rent + Interest + profits + indirect business taxes + depreciation + net income of foreigners. Based on this equation, we predict there is positive association between GDP and depreciation including Section 179 deductions, which leads to our main research hypotheses:

H1: GDP is positively associated with Section 179 deductions; and H2: GDP is more positively associated with Section 179 deductions than depreciation expensing allowance.

The paper is testing for the correlation using time-series data from the Internal Revenue Service and U.S. Bureau of Economic Analysis (BEA). The sample years are 2000- 2013, which is publicly available for both sources. To test impact to different tax payers, we distinguish the depreciation expensing allowance claimed by corporations and small business (sole proprietorship) in our data analysis section.

BEA is source of US economic statistics including GDP and growth rate. Corporation Depreciation Data is provided by NAICS industrial sector the numbers of returns claiming depreciation and the respective amounts from nearly all lines on the front page of the IRS Form 4562, "Depreciation and Amortization". The data exclude amounts reported on Forms 1120-S, 1120-REIT, and 1120-RIC. The Sole Proprietorship data include business receipts, deductions, and net income reported by an individual taxpayer on Schedule C of Form 1040. The information is for nonfarm sole proprietorships and is broken down by industrial groups for analysis of the data. Since the data presented here are estimates based on a sample of returns filed, they are subject to sampling error.

4. Data Analysis

Analytical Model

Since investment is generally viewed as a function of the cost of capital, a higher Section 179 deduction allowance limit should reduce the cost of capital and increase investment, subsequently increasing employment due to higher levels of production, which leads a higher economic growth in the following year. It supports the research hypothesis that GDP in year t+1 is positively associated with depreciation expensing allowance claimed in year t. The study uses logarithmic functional forms in distributed lag models to test this hypothesis. The basic form of our regression models includes unknown parameters (β), independent variables (X), and the dependent variable (Y). So $Y \approx f(X, \beta)$, it leads our analytical model as below:

$$y_{t+1} = \beta_0 + \beta_1 x_{1,t} + \beta_2 x_{2,t} + \beta_3 x_{3,t} + u_t$$

Where Y is economic growth measured by the natural logarithm of GDP, X is the natural logarithm of depreciation expensing allowances. X_1 is defined as Section 179 deductions claimed

by corporate taxpayers, X_2 is defined as depreciation deduction claimed by individual taxpayers (their business form is proprietorship and hereinafter referred to as small business), X_3 is total depreciation deductions claimed by corporate taxpayers. We predict all slope estimates be positive.

Descriptive Statistics

Table 1 presents descriptive statistics for our regression model. Our sample shows corporate taxpayers claimed more deprecation expensing allowances (mean 20.1864, median 22.2286) than small business (mean 17.4628, median 17.4354). Corporate taxpayers' depreciations consist primarily of Section 179 deductions (mean 15.8447, median 15.9896). This translates into average value (median value) of Section 179 deductions of $8 ($8.79) billion, untabulated, claimed by the corporations and indicates that Section 179 deductions significantly reduce the cost of corporate capital. In untabulated Person correlations among our test variables, X1 is positively correlated with X2 (.4884). Other correlations among the remainder of the variables are small and negative, thereby mitigating possible multicollinearity concerns.

	Y	*X1*	*X2*	*X3*
Mean	23.3374	15.8447	17.4628	20.1864
Median	23.3918	15.9896	17.4354	20.2286
Standard Deviation	0.1466	0.35106	0.09385	0.13218
Range	0.45029	1.09426	0.29297	0.49167
Minimum	23.0862	15.194	17.3066	19.9471
Maximum	23.5365	16.2883	17.5996	20.4388

Table 1 Descriptive Statistics of Regression Model

Regression Results

Table 2 provides the regressions results for testing H1. Model 1 consists of all three test variables. Model 2 tests H2 with only two variables. Both models have strong F-statistic values (22.28, p<.01; 25.47. p<.01), which suggests a significant model. Two models are well fitted with high adjusted R square values (.84 and .80). In Model 1, we observe the significant positive relationship predicted by hypothesis between GDP and Section 179 deductions. In addition, the positive and marginal significant coefficient on X3 (.24, p< 0.10) are recorded. Together, our regression documents positive correlation between GDP and Section 179 deductions, which supports H1. Surprisingly, the negative and marginal significant coefficient on X2 (-.39, p< 0.10) are also documented. One possible interpretation can be that depreciation offsets self-employment income of small business, which reduces GDP according to abovementioned resource cost/income approach to calculate GDP.

Variables	Prediction	Model 1	Prob.	Model 2	Prob.
X1, Sec.179	+	0.43	***	0.43	***
		(7.75)		(6.95)	
X2, Small Business	+	-0.39	*	-0.45	*
		(-1.89)		(-1.98)	
X3, Corporate	+	0.24	*		
		(1.86)			
Constant		18.62	***	24.51	***
		(4.10)		(6.75)	
R Square		0.88		0.84	
Adj. R Square		0.84		0.80	
F-statistic		22.28	***	25.47	***
AIC		-44.60		-47.29	
DW Statistic		2.00		1.88	

*, **, *** Robust t-statistics in parentheses denote statistical significance at p <0.10, p < 0.05, and p < 0.01, respectively, at the one-tailed level for variables with predictions, and two-tailed otherwise. Variables are defined in Section 4, Data Analysis

Table 2 Regression Results

Model 2 presents same pattern as Model 1. As predicted, Section 179 is significant at positive sign. It supports H 2. Meanwhile, the deprecation claimed by small business is negative and marginal significant. While the Section 179 expensing allowance is not targeted at self-employed people, the limits on its use effectively confine its benefits to small business owned by self-employed people.

Robust Tests

Akaike information criterion (AIC) is a measure of the relative quality of statistical models for a given set of data. Given a collection of models for the data, AIC estimates the quality of each model, relative to each of the other models. Hence, AIC provides a means for model selection. The AIC info is also provided under each regression model. The Bayesian information criterion (BIC) or Schwarz criterion is a criterion for model selection among a finite set of models; the model with the lowest BIC is preferred. It is based, in part, on the likelihood function and it is closely related to AIC. However, our AIC and BIC, untabulated, agree on the preferred model. Because the use of BIC seems justifiable for model screening in large-sample Bayesian analyses, we do not report this value for our models based on the size of n and relative magnitude of n and k. ΔAIC is 2.7, meaning positive strength of the evidence against Model 1 with the bigger AIC value. However, the higher R square and goodness of fit of the model describes how well the first model fits the set of observations. Further, F-statistic presents a significant fit of the model at level of 5 percent.

To check the collinearity in both Models, we calculate variance inflation factor (VIF). Model 1 has a range from 1.03 to 1.34. Model 2 has equivalent VIFs of 1.31. Multicollinearity is not a problem while interpreting our results. The Durbin–Watson statistic is less than 2, indicating no autocorrelation in the residuals from a regression analysis.

5. Discussion and Summary

The Protecting Americans from Tax Hikes Act of 2015 was passed by both the U.S. House and Senate and signed into law on December 18, 2015. This bill expanded the Section 179 deduction limit to $500,000 in 2016. This study documents evidence that higher Section 179 deductions, higher GDP. However, our findings do not support congress on its potential to stimulate increased small business investment in favored assets in the short run by reducing the user cost of capital and increasing the cash flow of investing firms. Both regression models present same pattern on coefficients. As predicted, we observe the significant positive relationship between GDP and Section 179 deductions. Regression results also suggest that GDP is more positively associated with Section 179 deductions than depreciation expensing allowance. But the deprecation claimed by small business is negative and marginal significant. This could be interpreted as offsetting effects of depreciation on self-employment income of small business, which reduces GDP according to abovementioned resource cost/income approach to calculate GDP. One possible explanation is while the Section 179 expensing allowance is not targeted at self-employed people, the limits on its use effectively confine its benefits to small business owned by self-employed people.

This study therefore suggests that annual increments of capital depreciation deductions will aid corporate growth as well as other variables that affect economic growth in the United States. Since investment is generally viewed as a function of the cost of capital, a higher Section 179 deduction allowance limit should reduce the cost of capital and increase investment, subsequently increasing GDP due to higher levels of production. However, the benefits for small business (individual taxpayers such as sole proprietorship) are less than for corporations.

A caveat for this study is that a strong correlation between two factors does not necessarily mean that one is a main cause of the other. In this case, a plausible explanation for

the correlation may be that firms with relatively low cost of capital invest more, on average, than firms with relatively high cost of capital for reasons that have little or nothing to do with the cash flows. Further, our regression results are based on limited sample years. Though our sample consists high-growth and low-growth economic periods, generalizing our findings to a long-term cycle is subject to examination. We recognize that other factors may affect economic growth and the relationship between cash flow and business investment is complicated, additional research is needed to shed more light on it.

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