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The Role of Taxation Theory in Economic Growth

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Abstract: The role of taxation theory in economic growth is a subject of significant interest in economic research. Economic growth is a critical indicator to measure the development level of a country or region. As a vital instrument for economic regulation, taxation plays an indispensable role in either promoting or constraining economic growth. This paper aims to explore the impact of taxation theory on economic growth, analyze the views of various economic schools on the relationship between taxation and economic growth, and evaluate the implications of these theories for the formulation of current economic policies. Employing a literature review method, this paper systematically examines the perspectives on the role of taxation from classical economic growth theory to modern endogenous growth theory. By comparing and analyzing the role and function of taxation within different theoretical frameworks, this paper further investigates how tax policies can influence economic growth through their effects on consumption, investment, and technological advancement. The findings of this study reveal that different economic theories provide diverse interpretations of the role of taxation in economic growth. Classical theories emphasize the negative impact of taxation on capital accumulation, while Keynesianism focuses on the role of taxation in regulating aggregate demand. The supply-side school highlights the significance of tax reduction in stimulating production and growth through the Laffer Curve. Neoclassical growth theory considers taxation as an exogenous factor affecting steady-state growth, whereas endogenous growth theory regards taxation as a key variable that drives economic growth by fostering technological progress and the accumulation of human capital. In conclusion, taxation assumes a multifaceted role in economic growth. Prudent tax policies can influence short-term economic fluctuations through their impact on consumption and investment and can also affect long-term growth trajectories by promoting technological advancement and the accumulation of human capital. Therefore, when devising tax policies, it is essential to consider their impact on both the short-term and long-term growth of the economy.

1. The Role of Taxation in Classical Economic Growth Theory

In the 1930s, British economist John Maynard Keynes proposed the theory of effective demand[1], which has had a profound impact on tax policy. According to Keynes, governments can use fiscal policy, especially tax policy, to regulate total demand, stimulate effective demand, and promote employment and economic stability during economic downturns. Keynes's theory was

based on observations of the real issues during the Great Depression of the 1930s. During this period, the global recession led to persistently high unemployment rates and severe idle capacity. Keynes believed that government intervention could reverse this phenomenon. He advocated that during economic downturns, governments should adopt moderate fiscal deficit policies, stimulate consumption and investment by reducing tax rates and increasing government spending, thereby raising effective demand.

From Keynes's perspective, tax policy plays a role in stimulating aggregate demand in two ways[2]. Firstly, reducing direct taxes (such as personal and corporate income taxes) can increase the disposable income of residents and businesses, thereby stimulating consumption and investment. Secondly, reducing indirect taxes (such as sales and consumption taxes) can reduce the prices of goods and services, further stimulating consumer purchases and business investment. At the same time, Keynes supported the implementation of contractionary fiscal policies during periods of economic prosperity, using increased tax efforts to contract excessive demand, slow down inflation, and curb bubbles.Keynes's theory of effective demand has brought significant changes to tax policy since the 20th century. Many countries have adopted Keynesian policies, successfully mobilizing effective demand during economic downturns and curbing overheating during prosperous periods. In summary, Keynes's tax policies based on the theory of effective demand provide governments with an effective method to address economic issues.

From the 1940s to the 1950s, the Harrod-Domar model[3] and the Solow-Swan model[3] were introduced, and these two economic models profoundly influenced the understanding of the pathways to economic growth and had a far-reaching impact on the role of taxation.

Firstly, the Harrod-Domar model explores the relationship between savings and investment, emphasizing the impact of savings and investment on economic growth. Within this theoretical framework, taxation is seen as a key tool for adjusting the relationship between savings and investment. Through tax policies, governments can enhance the public's desire to save and further convert these savings into investment, thereby promoting economic growth. Next, based on the assumption that technological progress is an externality, the Solow-Swan model analyzes the association between labor force growth, capital accumulation, and economic growth. In this model, taxation holds an important position. Governments can stimulate enterprises to increase capital investment and improve production efficiency through various tax policies, such as reducing corporate taxes and increasing consumption taxes. At the same time, they can directly or indirectly stimulate technological progress, thereby promoting economic growth. At the same time, by adjusting tax policies, they can affect labor supply, thus impacting economic growth. However, it is worth mentioning that both models adhere to the theory of exogenous economic growth, meaning that economic growth mainly comes from external factors, such as technological progress. In this case, taxation becomes more important in encouraging technological innovation and R&D investment. Governments can stimulate enterprises to increase R&D investment by reducing the tax burden on R&D, thereby promoting technological progress.

In general, the Harrod-Domar model and the Solow-Swan model of the 1940s and 1950s emphasize the important role of taxation in adjusting the relationship between savings and investment, stimulating corporate production investment and R&D investment, and affecting labor supply to achieve the goal of economic growth.

In the 1960s, the Cass-Koopmans model established a dynamic optimization economic growth model, incorporating Ramsey's consumer optimization analysis[4], which opened up new ideas for understanding the role of taxation and adjusting tax policies. In the Cass-Koopmans model, consumers make consumption and savings decisions based on their expected lifespan and expected interest rates, aiming to maximize their utility. Tax policy plays a key role in this analytical

framework. Governments can change consumers' consumption and savings decisions by adjusting tax rates, thereby affecting economic growth.

For example, governments can stimulate consumers to increase current consumption by reducing consumption tax rates, thereby stimulating economic growth. However, too low consumption taxes may lead to a vicious cycle because people will reduce savings, which may affect the mobilization of future investments and, consequently, economic long-term growth. On the contrary, governments can moderately increase savings tax rates to suppress consumption, increase savings, enhance investment, and promote long-term economic growth.

At the same time, according to the Cass-Koopmans model, governments can use different types of taxes, such as corporate taxes and personal income taxes, to affect investment decisions, labor supply, and people's consumption and savings behaviors, thus impacting economic growth. Overall, the Cass-Koopmans model clarifies the function of taxation, that is, governments can guide or adjust the economic behaviors of consumers and businesses through tax tools, thereby affecting economic growth.

The supply-side economics school [5] emerged in the 1970s, focusing on the impact of factors of production on economic growth, particularly in terms of tax policy. It includes two key theories: the "relative price" theory [3] and the "Laffer Curve" theory [3]. Let's first discuss the "relative price" theory. The supply-side school believes that the role of tax policy in economic growth is mainly reflected in influencing the allocation of production factors by changing their relative prices. Tax policies affect the decisions of enterprises and individuals on the input of production factors, thereby affecting economic growth. For example, reducing personal income tax on labor income (wages) can stimulate labor supply and increase people's enthusiasm for work, thereby promoting economic growth. Similarly, reducing taxes on capital income (such as profits, dividends, etc.) can stimulate savings and investment, thus promoting economic growth. In summary, the supply-side school emphasizes the positive role of tax reduction policies in the allocation of production factors.

Secondly, the "Laffer Curve" theory advocates for a more detailed study of the relationship between taxation and economic growth. The Laffer Curve, proposed by supply-side economist Arthur Laffer, describes the relationship between taxation and tax rates. The core point of the Laffer Curve is that both too high and too low tax rates can lead to a decline in tax revenue. When tax rates are too high, people's enthusiasm for work and investment decreases, leading to a reduction in economic activity and, consequently, a decline in tax revenue; when tax rates are too low, tax revenue also decreases. Therefore, there is an optimal tax rate level that can maximize tax revenue.

The supply-side school believes that appropriately adjusting tax rates to achieve the best tax level is beneficial to stimulate the enthusiasm of market entities and promote economic growth. Based on the Laffer Curve theory, the supply-side school advocates for implementing tax reduction policies at the right time to increase the tax base, increase tax revenue, and ultimately promote economic prosperity. The supply-side school's theories on taxation and economic growth in the 1970s emphasized the positive role of reducing taxes on the allocation of production factors and the economic behavior of market entities. By challenging traditional demand-side policies with the relative price theory and the Laffer Curve, they provided new ideas for the formulation and adjustment of tax policies. However, in practice, the supply-side school's tax policies have also been controversial, such as whether tax cuts have a significant long-term effect on economic growth and how to balance the short-term impact of tax cuts on the economy and government revenue.

During this period, the growth theory adopted a neoclassical production function, hence it is called neoclassical growth theory; a common feature of these models is that the mechanism of growth is exogenous, as the driving factors of growth mainly come from productivity improvement, that is, technological progress, which is considered an external factor in their theoretical models. In contrast, endogenous growth theory regards technological progress as an endogenous factor and

studies how it affects economic growth under internal mechanisms. Neoclassical growth models focus on the role of capital and labor in the economic growth process. According to the Solow-Swan model, long-term economic growth is mainly driven by the accumulation of production factors (including capital and labor) and the improvement of productivity (mainly technological progress). In this model, technological progress is considered an exogenous factor, which means that technological progress is not affected by factors within the model but is introduced into the economic system by external mechanisms. The setting of technological progress as an exogenous factor makes it difficult for the neoclassical growth model to explain the specific internal driving mechanisms behind economic growth.

In exogenous growth theory, taxes cannot affect growth for two reasons. First, according to neoclassical growth theory, economic growth mainly depends on the accumulation of production factors and technological progress. In the model, the impact of taxes on economic growth is very limited. Taxes mainly affect the distribution of labor and capital, but in the long-term steady state, the investment and growth patterns of the entire economic system will tend to be stable, which means that taxes cannot affect economic growth by changing the accumulation of production factors. Second, since technological progress is considered an exogenous factor in the neoclassical growth model, its growth is not affected by other factors in the model (such as taxes). Therefore, under the exogenous growth theory, tax policy will not directly affect the degree of technological progress. And the driving effect of technological progress on economic growth is huge, especially in the process of long-term development. Because the exogenous growth theory ignores the internal driving factors of technological progress, it makes tax policy seem unable to have a significant impact on economic growth under this theory.

In summary, the main characteristic of neoclassical growth theory, that is, exogenous growth theory, is to regard the driving force of growth as an external factor. Under this theoretical framework, taxes cannot have a direct impact on economic growth. However, in real life, endogenous growth theory not only explains the ways in which tax policy may affect economic growth through the study of internal driving mechanisms such as technological innovation, human capital, and technology spillover, but also provides more comprehensive theoretical guidance for the formulation of tax policy.

2. The role of taxation in endogenous economic growth theory

Endogenous growth theory originated in the mid-1980s and rapidly developed in the 1990s. The core models of this theory include Romer's knowledge spillover model, Lucas's human capital model [6], and Becker's division of labor and specialization model. On the curve of economic growth, in addition to traditional capital and labor, human capital and technological innovation are creatively added. The model assumes perfect competition and uses economy-wide increasing returns and technological externalities to explain economic growth, in order to more accurately explain the current economic development [7]. This approach overcomes the key property of diminishing marginal output of factors, thus constructing a new endogenous growth model. In these models, the key determinants of growth are endogenous, and long-term growth is determined by internal rather than external factors (such as unexplained technological progress). These new endogenous growth models simulate the process of growth concisely, and through the simulation of the growth process, reveal the impact of taxation on individual decisions. Endogenous growth models provide an interpretative perspective for understanding historical data and predict the results of future policy changes. This is of great significance for understanding the role of taxation in economic growth. Through these models, we can better understand and predict the impact of taxation on economic growth. To achieve endogenous growth, it is necessary to adopt some way to

overcome the diminishing marginal output, which is determined by the choices of economic participants. Existing literature indicates that there are four ways to achieve this goal, all of which achieve sustained economic growth through different paths.

The simplest endogenous growth model is the AK model, which assumes that capital is the only input factor, with constant returns to scale, and output is given by the function Y=AK. In the AK model, the long-term growth rate is determined by a positive fixed capital marginal return. Therefore, taxing capital income will directly reduce the marginal return of capital, thus affecting the long-term growth rate.

Another form of the model is to introduce human capital, where the growth of human capital and physical capital is considered to be synchronized. The existence of human capital helps to alleviate the constraints of diminishing returns to broad capital and ensures long-term per capita growth without external technological progress. In this model, there are two investment processes: physical capital investment and human capital investment. Viewing capital as consisting of two parts, human capital and physical capital, can solve the problem of diminishing marginal returns and create endogenous economic growth. This model can be applied to a single sector or two sectors. Barro, Mankiw, and Sala-i-Martin [8] established a single-sector endogenous growth model in 1992, where human capital and physical capital have the same production technology, and the output function is a fixed scale C-D form. From a more macro perspective, this single-sector model can be seen as an extension of the AK model, where the growth of either physical capital or human capital will lead to an increase in output and consumption. In terms of the impact of taxation, the research results are consistent with the AK model: taxation on physical capital and labor income will reduce their marginal returns, thus affecting the long-term growth rate. Uzawa [9] in 1965 and Lucas [10] in 1988 built a two-sector endogenous growth model, where human capital and physical capital have different production technologies, and the growth rate of output depends on the imbalance between physical and human capital. In this case, taxation affects both the accumulation of physical capital and human capital. The impact of taxation on physical capital and human capital growth is different, and the resulting tax distortions, especially the distortion of the tax structure, will affect the economic growth rate in the long term.

Romer (1986) drew on Arrow's (1962) [11] theoretical framework, based on Arrow (1962) and Sheshinski (1967) concepts, which all emphasize non-competitiveness and externalities, further elaborated on the "learning effect" model. It offsets the trend of diminishing returns by assuming that knowledge creation is a by-product of investment, thus achieving endogenous economic growth. The model has two assumptions: first, enterprises need to invest to obtain the "learning effect," and an increase in the capital stock of enterprises will lead to a synchronized increase in the knowledge stock; second, the knowledge of each enterprise is public property, and once knowledge is discovered, it will immediately spread throughout the economic field, thereby improving the production efficiency of all enterprises. Unlike Solow, Romer believes that government expenditure and tax policies can have a long-term and lasting impact on economic growth.

3. Conclusion

In summary, classical economic growth theory and endogenous economic growth theory have historically provided important insights for understanding the phenomenon of economic growth and formulating corresponding policies. Regarding the impact of tax policies, the two theories offer different explanations.

Classical economic growth theory originated from the research of classical economists such as Adam Smith and Thomas Malthus in the 18th century. Classical economic growth theory mainly posits that economic growth primarily depends on the scale effects of factors such as labor, capital,

and land. In classical economic growth theory, the role of tax policy is mainly to affect economic growth by influencing the use and allocation of factors. Classical economists generally believe that excessively high taxes may reduce the creative enthusiasm of workers and entrepreneurs and lead to an imbalance in resource allocation, thereby hindering economic growth.

Endogenous economic growth theory is an emerging theory that has gradually developed since the 1980s. Unlike classical economic growth theory, endogenous economic growth theory emphasizes the endogeneity of economic growth, that is, economic growth mainly depends on the quality of production factors, technological progress, and innovation. In endogenous growth theory, the impact of tax policy on economic growth is not only achieved through the classical factor scale effects but more importantly, it promotes economic growth by affecting incentives in areas such as intellectual property protection, education, and R&D expenditure. Endogenous growth theory believes that a moderate tax policy can provide necessary financial support for public investment, technological innovation, and human capital development, thus having a positive effect on economic growth.

In conclusion, classical economic growth theory and endogenous economic growth theory explain the impact of tax policy on economic growth from different perspectives. Classical theory mainly emphasizes that tax policy affects growth by influencing the scale of production factors; whereas endogenous theory emphasizes that tax policy can have a positive effect on economic growth by improving factor quality, technological innovation, and knowledge accumulation, complemented by moderate tax policies to promote economic growth. When formulating and implementing tax policies in practice, the views of both theories should be considered comprehensively to achieve sustainable economic growth.

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