Have Diminishing Returns Set in? The Efficiency of Indonesian Tax Administration

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INTRODUCTION

One of the main functions of a tax administration is to collect revenues for the government to finance its provision of public services. In this sense, a tax administration could be seen as managing revenue production process, in which multiple inputs are utilized to produce a single output, i.e., tax revenue. Therefore, the capacity of a tax administration to efficiently utilize its available physical and human resources in collecting revenues to finance government programs may affect the ability of the state to perform its function as the provider of public goods and services. The efficiency of a tax administration may affect the allocation and distribution of production factors in an economy and may consequently influence the rate of economic growth.

Indonesian tax administration (Directorate General of Taxes, DGT) has been expanding its resources to improve its revenue collection capacity. Empirical evidence, however, suggests that tax revenue as a share of the economy is actually decreasing. The increase in factor inputs (or resources), which is not followed by an increase in the output (in this case the tax revenue) suggests that DGT might operate at diminishing returns to scale. The available resources are possibly inefficiently used, leading to decline in tax collection performance. Simplifying the tax system, changing tax officials’ attitudes toward taxpayers, and improving the information system management and the business practices could be considered to increase the efficiency of tax administration. Maintaining the stability of tax legislations and overcoming organizational path dependencies could also be considered.

FIGURE 1

One of the prominent features in Figure 1 is the declining

Have Diminishing Returns Set in? The Efficiency of Indonesian Tax Administration

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Abstract. This article aims to determine whether Indonesia’s tax administration operates at diminishing returns to scale. The neoclassical growth model was employed to measure the tax administration’s Total Factor Productivity (TFP), which may represent the level of efficiency. A low level of TFP could indicate that an organization may be inefficient and thus may operate at diminishing returns to scale. Results show that the TFP of Indonesia’s tax administration is basically nonexistent, and the diminishing returns to scale might have set in its operations. Left unchanged, these conditions may imply some future limits to tax revenue expansions. Simplifying the tax system, changing tax officials’ attitudes toward taxpayers, and improving the information system management and the business practices could be considered to increase the efficiency of tax administration. Maintaining the stability of tax legislations and overcoming organizational path dependencies could also be considered.

Keywords: Total Factor Productivity, Tax Administration, Diminishing Returns, Efficiency JEL Classification: H20, H83, M10, O33

Abstrak. Artikel ini bertujuan untuk menentukan apakah administrasi pajak di Indonesia beroperasi pada tingkat imbal hasil yang menurun. Model pertumbuhan neoklasik digunakan untuk mengestimasi Total Factor Productivity (TFP), yang menunjukkan tingkat efisiensi. TFP yang rendah mengindikasikan bahwa suatu organisasi tidak efisien dan oleh karena itu mungkin beroperasi pada tingkat imbal hasil yang menurun. Hasil penelitian menunjukkan bahwa administrasi pajak di Indonesia memiliki TFP yang sangat rendah dan beroperasi pada tingkat imbal hasil yang menurun. Jika tidak ada perubahan, kondisi ini dapat membatasi peningkatan penerimaan pajak di masa depan. Penyederhanaan sistem perpajakan, perubahan sikap fiskus terhadap Wajib Pajak, dan perbaikan dalam manajemen sistem informasi dan proses bisnis mungkin dapat dipertimbangkan untuk meningkatkan efisiensi. Selain itu, mengurangi frekuensi perubahan peraturan dan mengatasi masalah kelembaman organisasi mungkin juga dapat dipertimbangkan untuk dilakukan.

Kata kunci: Total Factor Productivity, Administrasi Pajak, Tingkat Imbal Hasil, Efficiency JEL Classification: H20, H83, M10, O33

INTRODUCTION
trend of collection after 2008. For 2001–2008, the average ratio of collection was at 9.9% of GDP; for 2009–2017, this ratio was down to 8.9%. With this background, one of the approaches that could be considered to investigate the proximate causes for this fall in revenue collection is by assessing the efficiency of DGT’s operation.

For a tax administration, efficiency measurement is an essential tool because it enables policy makers to determine how well the tax administration utilizes resources in achieving its objectives. Two possible implications for future output expansions could be drawn from efficiency measurement exercises. First, efficiency assessment may be used as base for reallocation of resources from units or business processes that have low marginal returns to those that have relatively high marginal returns. Second, inefficiencies may imply that the available resources have not been utilized in the most productive manner; hence, further explorations on ways to improve productive efficiency are warranted (Yaisawarng, 2002).

However, quantitative measurement on the efficiency with which the Indonesian tax administration uses its resources to accomplish its mission of collecting tax revenues has scarcely been studied; hence, this study aims to fill this gap. To the best of the author’s knowledge, this study is the first to employ neoclassical growth theory in assessing the efficiency of a tax administration, particularly in the context of developing countries, such as Indonesia.

The research question proposed in this article is as follows: Does DGT operate at diminishing returns to scale? This question can be answered by estimating the DGT’s Total Factor Productivity (TFP). According to neoclassical growth theory, a low level of TFP indicates that organization’s operations are inefficient. When the operations are inefficient, the law of diminishing returns to scale would set in, that is, marginal increases in the input of resources would result in reductions in the marginal output.

Administrative dimension is one of the important factors in the tax system because how a tax administration implements existing tax policies may affect, among others, how much revenue can be collected (Bird, 2004). In a broader term, the level of tax revenue in a country may reflect the capacity of state institutions, including the tax administration, in collecting taxes (Levi, 1989; Slemrod, Blumenthal, & W. Christian, 2001; Tilly, 1990). Further, the capacity of a tax administration in generating revenues from a given set of tax systems and policies may depend on its ability to utilize available resources toward insuring citizens’ compliance with tax laws (Klun, 2004).

One strand of literature argues that tax compliance is rarely the result of pure altruistic behavior; instead, it is the result of policies aimed at enforcing tax laws and deterring citizens’ nonconformity with such laws (Allingham & Sandmo, 1972; Bergman, 2003; Clotfelter, 1983; Cowell, 1990). Thus, the relation between tax administration and taxpayers could be described as antagonistic (Braithwaite, 2003a). In this antagonistic relation environment, the tax administration holds the view that taxpayers need to be constantly held in check since they would always attempt to evade paying taxes whenever they can (Cialdini, 1996; Frey, 2003). On the other hand, taxpayers hold the view that they are being persecuted and thus feel that they have the right to engage in rational weighing on the risks and benefits of evading taxes (Orviska & Hudson, 2003; Trivedi, Shehata, & Mestelman, 2004; Wenzel, 2005).

The other strand of literature maintains that tax compliance is the outcome of the willingness of citizens to voluntarily pay taxes because they hold the view that paying taxes is their obligation as members of community. In this environment, a synergistic relation exists between tax administration and taxpayers (Kirchler, Hoelzl, & Wahl, 2008). The tax administration’s attitudes reflect respectful and supportive treatments toward taxpayers (Feld & Frey, 2004). Taxpayers have faith in the underlying objectives of the government and hence pay their fair share of taxes without even considering the costs and benefits of evading taxes (Feld & Frey, 2002; Fjeldstad, 2004; Rawlings, 2003).

These two lines of arguments imply that to improve tax collection, a tax administration could focus its resources...
toward improving the power of tax administration and the trust of taxpayers (Kirchler, 2007; Tyler, 2006). Efforts to improve the power of tax administration may be directed toward influencing public perceptions on the capability of tax officers in detecting and punishing noncompliance behavior, for example by increasing the probability and quality of tax audits as well as by imposing sufficiently high fines (Andreoni, Erard, & Feinstein, 1998; Park & Hyun, 2003; Wärneryd & Walerud, 1982). Efforts to improve trust in tax administration could be directed toward influencing public perception toward the view that the tax administration works for the common goods of the society and will treat taxpayers fairly and respectfully (Braithwaite, 2003b; Wenzel, 2003).

One of the crucial premises in collecting taxes requires the tax administration to utilize its available resources efficiently. Nevertheless, a general, agreed upon model for assessing tax administration’s performance has not been established (Klun, 2004). Given this lack of a unified model, literature provides various methods to measure the performance of tax administration. For example, Baer and Silvani (1997) suggested that tax administration’s performance may best be measured based on the tax collection process and the magnitude of the tax gap, i.e., the difference between the amount of tax supposedly owed to the government and the actual tax collected. The World Bank (2011) proposed a measurement that includes various elements encompassing three broad categories: legal and regulatory, institutional set up, and core business functions. Crandall (2010) argued that assessment of tax administration’s performance should be based on key performance indicators, such as tax revenue collected compared with projections and the ratio of costs to collection.

The performance of a tax administration may be assessed by the efficiency with which it uses its available resources. In this respect, how efficient the tax administration uses its resources may be assessed under the framework of neoclassical growth theory. According to this theory, the main reason why the output of an economic entity (e.g., a country, a business, or an organization) changes is because of changes in capital stock, labor force, and/or productivity. Capital stock represents a set of physical tools (e.g., offices and computers) used to generate output. Labor force represents the number of workers participating in production. Productivity is the ability of the economic entity in harnessing available physical and human resources to generate output (Hahn, 2010; Horowitz, 2017).

The essence of neoclassical growth theory is the proposition that sustaining positive, long-run growth in output requires perpetual increase in technological progress. This increase could manifest in the form of new markets, goods, or processes (Aghion, Howitt, Brant-Collett, & Garcia-Peñalosa, 1998). In their seminal papers, Solow (1956) and Swan (1956) demonstrated that the output of an economic entity would cease to grow when technological progress did not exist. This cessation of output growth occurred because according to the law of diminishing returns, marginal increase in factor inputs would not result in proportional increase in marginal output.

According to neoclassical growth theory, the level of technological progress (proxied by the level of TFP) indicates the efficiency of an organization in utilizing all of its production factors to produce output. A higher level of TFP indicates that an organization operates at relatively more efficient level and that its productivity is higher as well. This efficiency is needed to stem the law of diminishing returns from setting in organization’s operations. The word “technology” in TFP is a broad, all-inclusive definition, which depends on many things including but not limited to research and development, education, infrastructure, protection of property rights, political stability, and management skills of producers and entrepreneurs (Krugman & Wells, 2006; Van den Berg, 2012). There is a large body of literature on the neoclassical growth theory. The works of Dimand and Spencer (2009); Hahn (2010); Solow (1999) could be chosen as starting points for those interested to elaborate more.

However, assessment on the efficiency of public sector institution within the framework of growth theory is scarce in literature. Examples in this limited line of research can be found in the works of Bartel and Harrison (2005); Dombi and Dedák (2018); Ehrlich, Gallais-Hammono, Liu, and Lutter (1994). This scarcity might relate to conceptual problems typically encountered in measuring public sector efficiency, particularly difficulties in quantifying the appropriate measure of output. Market prices for some areas of government, such as defense, public education, and public roads, simply do not exist (Madden, Savage, & Kemp, 1997).

For a tax administration, its output may be relatively less difficult to quantify. The monetary value of the output of a tax administration in terms of tax revenue is available from official publications. Although the level of taxes may not indicate a market price in its pure sense; however, the amount of taxes collected by the tax administration may be assumed to reflect the prices that citizens are willing to pay for government services, regardless of their motives. Citizens may pay their taxes out of voluntary obligation to society or because of the risks of punishment associated with noncompliance.

This study aims to fill the gap in literature on the assessment of tax administration’s performance under the conceptual framework of neoclassical growth theory. Considering that Indonesia is a developing country, this study would shed insights on the underexplored area of the dynamics of diminishing returns to scale in tax administration’s operations, particularly in the settings of a developing economy.

The neoclassical growth model was employed to answer the research question: does DGT operate at diminishing returns to scale? This model is employed because it can calculate the level of efficiency of DGT in utilizing its physical and human resources (as proxied by the level of TFP). A low level of TFP may indicate that the law of diminishing returns to scale may have set in DGT’s operations.

**RESEARCH METHOD**

Empirical data were analyzed using the framework of the neoclassical growth model with the tax administration was seen as doing revenue production process, which involved the utilization of multiple inputs to produce output, that is tax revenue. According to neoclassical growth theory, long-run output growth can only be sustained by perpetual increase in technological progress, and the state of technological progress is captured by TFP. The level of TFP indicates the efficiency with which an organization can utilize all of its factors of production (classified into capital stock and labor) to generate output. The higher the level of TFP is, the higher would be the organization’s productive efficiency; thus, the law of diminishing returns to scale would be unlikely to set in its
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Result

Table 3 presents the results of TFP growth calculations for DGT, as specified by Equation (3). For the period under study, the average growth of TFP was −0.07 per year. The very low level of TFP may indicate that the productive efficiency in DGT’s operations virtually did not exist. Growth in tax revenue could be the result of the accumulation of factor inputs (i.e., capital stock and labor) and not due to the efficiency in utilizing these resources.

As shown in Table 3, for the entire period under study, the growth in tax revenue could be explained by increases in capital stock, and 36% could be explained by increases in labor hiring while TFP only explained 16%.

One of the crucial predictions suggested by neoclassical growth theory is that in the absence of TFP, output growth would cease to exist once the law of diminishing returns sets in. This proposition might best be explained using the model developed by Solow (1956) and Swan (1956), as follows:

\[ Y = A + K^\alpha + L^{1-\alpha} \]

where \( Y \) denotes the output, \( A \) indicates the TFP, \( K \) is the capital stock, and \( L \) represents labor. \( \alpha \) represents the share of capital input in the production process, and \( 1-\alpha \) represents the share of labor input in the production process.

According to this model, additional growth in output could be spurred by increases in the inputs of capital stock and labor. However, merely increasing the inputs of capital (\( K \)) and labor (\( L \)), without increasing the efficiency with which these inputs are utilized (\( A \)), would only sustain output growth for a time. In the long run, however, output growth would “hit the wall”; that is, input utilization would run into diminishing returns. Hence, when the level of TFP is sufficiently low, at some point, diminishing returns would set in. At this point, increasing the capital and labor would result in lower incremental per-unit returns, thereby limiting further output expansions.

Equation (1) can be restated in a logarithmic differential form, \( \cdot \), with respect to time, \( t \), as follows:

\[ \dot{y}_t = a_t + \alpha \dot{k}_t + (1 - \alpha) \dot{l}_t \]

Once an estimate of the share of capital input (\( \alpha \)) has been provided, TFP (\( \hat{a}_t \)) can be calculated using the following equation:

\[ \hat{a}_t = \dot{y}_t - \alpha \dot{k}_t - (1 - \alpha) \dot{l}_t \]

Here, \( \alpha \) was estimated using the proxy of the share of capital input in the output of the aggregate economy. The available data for calculating the capital’s share in the aggregate economy are from the Social Accounting Matrix (SAM) published by Indonesia’s Bureau of Statistics (Badan Pusat Statistik, BPS). Table 1 reports the calculations of \( \alpha \) for years when data on SAM were available; on average, \( \alpha \) was found to be 0.56.

The period under study covered the years from 2008 through 2017 due to data availability, particularly data on DGT’s capital stock. The year 2008 was chosen as a starting point because in this year, the DGT started to compile and publicly report data on the value of its fixed assets. Further, 2017 was chosen as the end or the latest when such data were publicly available.

Data on the output of DGT (i.e., tax revenues) were derived mainly from the publications of the annual report of DGT (Table 1 in the Appendix of this article). Data on tax revenue comprised taxes that are administered and collected by DGT: income taxes, value-added taxes, property taxes, and stamp-duty.

Data on capital stock consist of physical assets, such as office buildings, information systems (both hardware and software), and vehicles, under DGT’s management. These data cover all fixed assets, including assets that have useful life span of more than one year, and were compiled from the financial reports and annual reports of DGT. From 2008 to 2012, the fixed assets were reported at gross value, i.e., the value before depreciation. Data on the net value of fixed assets and the value of depreciation were only available for 2013–2017. Hence, the average rate of depreciation for 2013–2017 was employed to estimate the depreciation of fixed asset for 2008–2012. These data on the net book value of fixed asset for the entire period under study are reported in Table 2 in the Appendix.

Data on the number of workers (labor) were collected from DGT’s annual reports and shown in Table 3 in the Appendix. Current monetary values were restated to the fix the 2010 prices by using GDP deflator provided by the World Bank’s World Development Indicators (World Bank, 2019).

Table 1. Capital’s Share of Output in Aggregate Economy (2005=100)

<table>
<thead>
<tr>
<th>Year</th>
<th>Capital Shares (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>321,222.62</td>
</tr>
<tr>
<td>1995</td>
<td>396,693.36</td>
</tr>
<tr>
<td>1998</td>
<td>135,548.23</td>
</tr>
<tr>
<td>1999</td>
<td>102,482.79</td>
</tr>
<tr>
<td>2000</td>
<td>142,343.33</td>
</tr>
<tr>
<td>2003</td>
<td>117,308.36</td>
</tr>
<tr>
<td>2005</td>
<td>138,741.92</td>
</tr>
<tr>
<td>2008</td>
<td>192,659.20</td>
</tr>
<tr>
<td>Average</td>
<td>0.56</td>
</tr>
</tbody>
</table>


Table 2. the descriptive statistics of the data employed in the analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax Revenue (Trillion Rupiah, 2010=100)</td>
<td>627.45</td>
<td>750.25</td>
<td>82.06</td>
</tr>
<tr>
<td>Capital Stock (Trillion Rupiah, 2010=100)</td>
<td>9.19</td>
<td>11.95</td>
<td>5.50</td>
</tr>
<tr>
<td>Labor (Person)</td>
<td>31,219</td>
<td>43,072</td>
<td>42,04</td>
</tr>
</tbody>
</table>

Note: N.A. = Not Available, this is because data for previous year (2007) are not available; hence, the rate of growth for 2008 cannot be calculated.

According to neoclassical growth theory, without continuous improvement in productive efficiency, output growth would cease to exist because the law of diminishing returns would set in. When an organization operates at diminishing returns to scale, putting more resources into production would result in a decreasing output per unit of resource committed into production. In other words, the marginal output gained from adding more inputs would decrease when the production is inefficient.

Figure 2 shows the diminishing returns to scale which might have set in DGT’s operations. The growth of tax revenue is compared with that of factor inputs which are capital stock and labor. From 2008 to 2011, the pace of growth of tax revenue was slower than that of capital stock and labor. This finding might show the period when the DGT accumulated factor inputs to maintain growth in tax revenue. In 2012–2014, the factor inputs accumulated in the previous period seemed to show their results. In this period, the growth in tax revenue was higher than the growth in capital stock and labor. However, in 2015–2017, diminishing returns seemed to set in possibly due to the lack of productive efficiency. In this period, significant growth in capital stock and labor resulted in only modest growth in tax revenue. In 2015–2017, the average growth of capital input was 63.5%, the average growth of labor input was 7.7%, and the average growth of tax revenue was only 1.7%.

Overall, Figure 2 shows that the DGT needed bigger growth in inputs to produce smaller growth in output, indicating that diminishing returns might have set in. When this condition is left untreated, it might limit the capacity of the DGT to increase tax revenues in the future (assuming there would be no increases in tax rates).

One of the consequences of the lack of productive efficiency in tax administration could be described by comparing the growth rate of the economy vis-à-vis the growth rate of tax revenue, as presented in Figure 3.

As shown in Figure 3, after a significant drop in 2009, the growth in tax revenue bounced and reached the highest level in 2011. In this year, tax collection grew at 10.01%, while the economy only grew at 6.17%. After 2011, the growth in tax revenue declined; since 2014, the growth rate was below the growth rate of the aggregate economy. Overall, for 2008–2017, the average growth of tax revenue was only 3.16%, whereas the average growth of the economy was 5.46%.

The lower rate of growth in tax collection relative to the growth rate of the economy could be linked to the absence of efficiency in the tax administration’s operations. The lack of productive efficiency might pose a potential limit to DGT in sustaining long-term growth in tax revenue. According to neoclassical growth theory, in the long run, the only thing that matters for output expansions is the level of TFP; in the words of Krugman (1990). “Productivity isn’t everything, but in the long run it is almost everything.”

Should this lack of TFP growth continue, it might drive the DGT to add more factor inputs to maintain the growth in tax revenues. However, basing the output growth merely on the expansions of inputs would unavoidably subject to diminishing returns. This limited potential to future growth in tax revenue might be a major concern because a significant underground economy that is generally difficult to tax exists in Indonesia. Studies regarding the magnitude of underground economy in Indonesia were varied: 25% of GDP in Wibowo (2001), around 20% of GDP in Tatariyanto (2014), and 18% of GDP in Schneider, Buehn, and Montenegro (2010).

The absence of TFP may imply that the tax administration has a limited capacity in utilizing its resources efficiently to detect, deter, and punish noncompliance in the underground economy. In other words, difficulties in producing more output per unit of input arising from the lack of productive

Table 3. Growth Accounting of DGT (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>$y_t$</th>
<th>$\beta_k t$</th>
<th>$(1 - \bar{\alpha}) t$</th>
<th>$\bar{\alpha}_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>2009</td>
<td>-1.94</td>
<td>0.26</td>
<td>0.07</td>
<td>-2.27</td>
</tr>
<tr>
<td>2010</td>
<td>0.01</td>
<td>-0.22</td>
<td>0.12</td>
<td>0.11</td>
</tr>
<tr>
<td>2011</td>
<td>1.48</td>
<td>-0.06</td>
<td>-0.13</td>
<td>1.67</td>
</tr>
<tr>
<td>2012</td>
<td>1.24</td>
<td>-0.03</td>
<td>-0.06</td>
<td>1.33</td>
</tr>
<tr>
<td>2013</td>
<td>0.74</td>
<td>-0.09</td>
<td>0.13</td>
<td>0.71</td>
</tr>
<tr>
<td>2014</td>
<td>0.21</td>
<td>-0.02</td>
<td>0.28</td>
<td>-0.06</td>
</tr>
<tr>
<td>2015</td>
<td>0.53</td>
<td>0.03</td>
<td>0.40</td>
<td>0.09</td>
</tr>
<tr>
<td>2016</td>
<td>0.25</td>
<td>-0.07</td>
<td>0.22</td>
<td>0.10</td>
</tr>
<tr>
<td>2017</td>
<td>-0.02</td>
<td>2.01</td>
<td>0.30</td>
<td>-2.34</td>
</tr>
</tbody>
</table>

Average: 0.28, 0.20, 0.15, -0.07

Source: Processed by author.

Figure 2. Growth of Tax Revenue and Factor Inputs

Figure 3. Growth in Tax Revenue and Economy (2010=100)

efficiency could restrict the ability to increase the level of tax collection from the underground economy.

Moreover, the notion of diminishing returns could imply limits to the future ability of the DGT to maintain adequate control over taxpayers who were already registered in the tax net. This control is necessary to ensure the highest possible levels of compliance with the tax laws. In this regard, one of the consequences of the nonexistence of TFP is that the tax administration would have to rely on mobilizations of capital and labor inputs to increase the tax collection from the improved compliance of the registered taxpayers. However, as discussed previously, relying output growth merely on input mobilizations cannot continue indefinitely because diminishing returns would decrease the ratio of taxes collected to the amount of inputs required to monitor taxpayers. Without improvements in the level of TFP, long-term output growth in tax collection may cease to exist.

Policy Implications

One of the avenues of approach that can be chosen to improve efficiency is through reforming the managerial aspects of the organization because this is one of the determinants that could explain productivity growth at microeconomic levels [for example, the studies of Bloom, Mahajan, McKenzie, and Roberts (2018); Karlan, Knight, and Udry (2015); McKenzie and Woodruff (2013)]. In relation to tax administration, some measures (Bird, 2010) could be implemented to improve the DGT’s efficiency in collecting taxes. First, the tax system may need to be simplified so that the system can be applied in a low-compliance environment. For example, terminating requirements for unnecessary information in tax returns as well as designing a consolidated form for return and payment could be considered. Once the system is simplified, the tax administration would focus its limited resources toward its main tasks, namely, facilitating and monitoring compliance as well as handling noncompliance.

Further, the tax administration may need to change its attitudes toward viewing taxpayers as clients rather than treating them as potential criminals. When the tax administration views taxpayers as potential criminals, significant resources would be diverted toward identifying, controlling, and catching those who cheat. Studies show, however, that these measures rarely provide optimum results (Kirchler et al. (2008)). More could be gained from treating taxpayers as client, relative to the resources committed. In this respect, one of the measures that could be considered by the DGT may involve improving taxpayers’ services by reducing uncertainty; for example, by clarifying ambiguities in legal aspects. Giving clarifications to taxpayers regarding simple issues, such as the tax rate for certain business transaction, improving communications to taxpayers to convey about what the law is and refraining from changing the regulations too often that no one quite knows what they are could also be considered. These efforts may reduce the compliance cost for taxpayers and the administrative cost for the DGT, thereby improving efficiency.

In theory, TFP could closely be associated with technological changes (Aghion & Howitt, 1990; Romer, 1990). One of the examples of technological changes is advances in Information Technology (IT); proper management on this aspect was argued to have large potential effects on improving the productivity of organizations (Stiroh, 2016). Appropriate management of IT may reduce the costs of coordination, communications, and information processing; thus, they may spur efficient utilizations of resources (Brynjolfsson & Hitt, 2000). However, to optimally realize the potential benefits of the IT systems, they need to be managed and designed in such a way as to facilitate the automation of business processes. Without these automations, productivity gains from IT adoption might not materialize for organizations (Dedrick, Gurbaxani, & Kraemer, 2003).

Efforts to reform Indonesia’s tax administration were prompted by macroeconomic and fiscal shocks following the Asian financial crisis of 1997/1998. One of the reformed areas involved updating IT hardware and software to better support the core business processes of DGT. Changes occurred in the information systems, which initially aimed to automate the processes of taxpayer services and data utilization. Some positive outcomes are evident, for example the majority of tax returns are now filed electronically and tax payments are processed through electronic systems that directly links data from the banking sector to the DGT (Direktorat Jenderal Pajak, 2017).

After more than two decades of reform; however, no unified information system has been established at the DGT. This condition complicates the utilization of data, which are generated from tax returns and third-party information for audit purposes. Under the current information systems, a tax officer must manually browse through various computer applications and then through various menus in each application to monitor taxpayers’ reports and to cross-check the data provided by these reports with third-party information. This procedure further complicates the risk management strategies set by the DGT because these strategies rely on the ability to identify, in accurate and timely manners, inconsistencies between data from tax returns and third-party information. Given that this identification is on a large part conducted manually (although this process may be paperless because it may be done on computer spreadsheets), involving 39 million registered taxpayers (Direktorat Jenderal Pajak, 2017), the process is significantly inefficient. Moreover, the information systems cannot produce accurate amount of arrears that have to be collected from taxpayers, thereby adding to the complexity and inefficiencies in collection efforts.

Further, the inadequacy of information provided by the available systems prompts tax administrators to devise their own information systems. As a result, local offices may have different information systems as additions to the systems already provided by the DGT head office. These “in-house” information systems may cause information fragmentation because the information they produce may only be available for the local tax office that developed the systems. As a result, this fragmentation of information may hamper the sharing of data and information between local offices as well as between the head office and local offices. This condition may further impede efficient monitoring of taxpayers’ compliance because the fragmented information could not support nationwide, credible, and data-driven enforcement efforts.

Nevertheless, the suboptimal gains from IT adoption in improving the efficiency of tax administration may not be exclusively experienced by Indonesia. Efforts to reform tax administrations in developing countries generally involved changes in IT; however, their payoffs often unable to reach expectations [Jenkins (1996); Kumar, Nagar, and Samanta
because the available information systems could not produce
ad-hoc basis by manually sorting through various documents
ally. Moreover, local offices should supply information on an
the required data have to be collected and written manu-
required that tax officers submit routine reports in which
systems that have been adopted, existing regulations still
iciency of DGT. For example, despite various information
procurements away from the real missions of organization; all of
solutions on the benefits and drawbacks of the existing procedures
policies without thorough qualitative and quantitative evalua-
tions would only put burdens on employees and on physical
additional management practices in excess of existing pro-
increases in productivity (Büchel, 2016). Simply adopting
ensure that the organization has been reaping benefits through

in the area of business process. A large body of literature focuses on the consequences of busi-
ness process management on productivity at firm and national levels. Recent studies include the works of Adharyu, Kala,
and Nysadham (2016); Bertrand and Schaar (2003); Bruhn,
Karlan, and Schaar (2018); Garcia, Mueller, and Zilibotti
(2013). Bloom and Van Reenen (2007) found that the qual-
ity of implementation of managerial practices was strongly
related to firm’s productivity. This finding suggests that
once an organization decides to adopt a good managerial
practice, improvement in productivity would materialize after
that practice has deeply embedded within the organization.
In other words, the better a managerial practice is adopted,
the more embedded its implementation, the higher would be
the performance of the organization.

Hence, managers should identify whether practices
adopted by their organizations are better than other alter-
atives, have been fully utilized to their full potential, and
ensure that the organization has been reaping benefits through
increases in productivity (Büchel, 2016). Simply adopting
additional management practices in excess of existing pro-
cesses would only put burdens on employees and on physical
resources without significant marginal increases in productiv-
ity. By the same token, too frequent changes in managerial
policies without thorough qualitative and quantitative evalu-
ations on the benefits and drawbacks of the existing procedures
to be replaced as well as of the new ones to be adopted would
only result in confusion, disruption in organization’s focus,
and diversions of resources toward introducing the new pro-
cedures away from the real missions of organization; all of
these may adversely affect productivity.

This problem might have dragged the productive effi-
ciency of DGT. For example, despite various information
systems that have been adopted, existing regulations still
required that tax officers submit routine reports in which
the required data have to be collected and written manu-
ally. Moreover, local offices should supply information on an
ad-hoc basis by manually sorting through various documents
because the available information systems could not produce
specific or accurate information. These activities are time
consuming, prone to errors, may cause redundancies, and
potentially distract the attention of tax officers from their main
tasks of servicing and monitoring taxpayers.

Further, the lack of efficiency in the DGT might be the
result of the problem with the consistency of the tax regime.
Surveys by Deloitte (2014, 2017) indicated that one of the
issues pointed out by respondents was the inconsistency of
the Indonesian tax regime. Specifically, this problem was
related to the frequent changes in tax legislations. Moreover,
the publicly available guidance from the tax authority was
often ambiguous (Deloitte, 2014, 2017). Hence, the problem
with the stability of the tax legislations may partially explain
the lack of efficiency in DGT operations because even the
most sophisticated tax administration in the world would be
overwhelmed with complicated tasks that hamper its effi-
ciency when the tax structure becomes overly complex due
to frequent changes in legislations (Bird, 2004).

The limited role of education in supporting the efficiency
of DGT remains puzzling. In theory, education is argued to
play a significant role in TFP growth through three mecha-
nisms. First, education could promote labor productivity
through increases in human capital inherent in the labor
force (Mankiw, Romer, & Weil, 1992). Second, education
could promote growth by increasing the innovative capacity
in product, process, and technology (Aghion, Howitt, &
Garcia-Penalosa, 1998; Lucas, 1988; Romer, 1990). Third,
education could promote growth by facilitating the diffusion
and transmission of knowledge and new technologies

The educational attainments of DGT staffs through formal
education or through training programs have been increasing.
In 2008, the number of DGT staffs with bachelor, master, and
doctoral degrees was 13,060 or 42% of the entire employees
(Direktorat Jenderal Pajak, 2008). In 2017, 21,500 staffs or
50% of the total employees had the same academic degrees
(Direktorat Jenderal Pajak, 2017). For employee training, 328
training programs involving 28,008 staffs were conducted in
2010 (Direktorat Jenderal Pajak, 2010b). In 2017, 501 training
programs involving 20,652 staffs were conducted.

One of the possible explanations for this lack of efficiency
growth amid increases in labors’ educational attainment may be the inadequate quality of information systems. Increases in
human capital from educational attainment have not been able
to translate into improvement in labor productivity because
the available information systems could not support staffs’
productive activities. As discussed previously, tax officers
have to manually sort through various computer applications
to check taxpayers’ compliance; under this condition,
even staff with a master’s degree in accounting could be
overwhelmed to manually monitor thousands of taxpayers
under his/her responsibility. Data for 2017 showed that the
number of staff directly responsible for monitoring compli-
ance (or Account Representative) was 9,725 whereas the
number of registered taxpayers was 39,151,603. Thus, on
average, one Account Representative had to monitor 4,025
taxpayers (Direktorat Jenderal Pajak, 2017). This condition
might impede the DGT from fully exploiting increases in
the education of its human capital to improve productivity.

Another possible explanation for this lack of efficiency
 gains from education may relate to organizational path depen-
dency. The theory of path dependency basically demonstrates
how particular laws, rules, and institutions may cause heavy
disincentives for change because large resources are already
invested in the current ways of doing things (Pierson, 2011).
Path dependency may drag the DGT’s productive efficiency amid increases in educational attainment. For example, some operational procedures still require that certain reports must be regularly submitted to the head office. Although computer information systems are available, these procedures have not been annulled; as such, even with better educated staffs, these tasks are still time consuming and cause lags in information availability. Another example for the possibility of path dependency may relate to the quality of the information systems, which even with their drawbacks, as discussed previously, are still being used for decades.

**Research Limitations and Directions for Future Research**

One of the limitations of the neoclassical growth model is that it treats TFP growth exogenously. Therefore, the model employed in this study does not conduct empirical tests regarding the sources of TFP growth. Future research should conduct empirical tests to determine factors that affect the growth of TFP in Indonesian tax administration.

Other limitations may involve the period of the study. This study only covers the period of 2008–2017 due to limitations in data availability. Neoclassical growth theory is concerned with the sources of output growth of an economic entity in the long run. Therefore, when more data are available, future studies could measure the efficiency of Indonesian tax administration over a longer time period. This endeavor might provide better insights into the possible determinants of efficiency and propose more comprehensive policy recommendations.

**CONCLUSION**

Employing the framework of neoclassical growth theory, this study found that the productive efficiency, which was measured by growth in TFP, of the Indonesia’s tax administration (DGT) was basically nonexistent. Moreover, diminishing returns to scale were found to have set in DGT operations due to the lack of TFP. This condition may imply some future limits to tax revenue expansions from the tax administration.

Areas that could be considered for improving the efficiency of the DGT may involve simplifying the tax system and changing the attitudes of the tax administration toward viewing taxpayers as clients, not as potential criminals. Once procedures were simplified and services to taxpayers as clients improved, the tax administration would be able to focus its limited resources toward its main tasks, namely, facilitating and monitoring compliance and handling noncompliance. With a more focus in carrying its main tasks, the tax administration might be able to improve its efficiency.

Other areas that could be considered to boost efficiency may involve improvements in the management of the information system. Renovations in IT should include efforts to automate the process of cross-checking data from tax returns against data from third-parties. Improving the accuracy of data may also spur efficient operations. Further, a single and centralized information system could avoid information fragmentation. These improvements in the management of the information system might increase the efficiency through their effects on easing the burden of the tax officials and reducing the compliance costs borne by taxpayers.

Efforts to raise efficiency could be directed toward improving the tax administration’s business process. Regular and irregular reports, which have to be prepared manually, should be discontinued. As replacements, the information system should be designed to provide the needed information. In this way, resources could be freed and be focused on servicing and monitoring taxpayers. Further, maintaining the stability of tax legislations and overcoming organizational path dependencies might enable the DGT to improve efficiency gains from human resources’ educational attainment.

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This article was prepared in author’s personal capacity. The opinions expressed in this article are the author’s own and do not reflect the view of the organization with which the author affiliated.

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ISWAHYUDI, HAVE DIMINISHING RETURNS SET IN?


