BADAN PENDIDIKAN DAN
PELATIHAN KEUANGAN
KEMENTERIAN KEUANGAN
REPUBLIK INDONESIA

JURNAL BPPK

ECONOMIC CONSEQUENCES OF TAX NONCOMPLIANCE: EVIDENCE FROM INDONESIA

Heru Iswahyudi
Kementerian Keuangan Republik Indonesia, Email: heru.iswahyudi@gmail.com

ARTICLE INFORMATION	ABSTRACT
	Artikel ini bertujuan untuk menilai dampak dari ketidakpatuhan terhadap peraturan perpajakan terhadap pertumbuhan ekonomi Indonesia ditinjau dari sudut pandang teori pertumbuhan endogen. Penilaian dilakukan dengan membandingkan produktivitas investasi sektor publik (yang sebagian besar dibiayai dari penerimaan perpajakan) dengan produktivitas investasi sektor swasta (yang dapat dibiayai dari hasil penghindaran pajak). Hasil empiris dalam studi ini menunjukkan bahwa investasi sektor swasta memiliki produktivitas yang lebih tinggi daripada investasi sektor publik. Lebih jauh, investasi sektor swasta memiliki peranan yang lebih besar dan lebih penting dalam proses pertumbuhan ekonomi dibandingkan investasi sektor publik dan temuan ini telah melalui uji ketahanan terhadap beberapa spesifikasi regresi yang berbeda-beda. Hal ini bukan berarti bahwa otoritas perpajakan harus mendiamkan adanya ketidakpatuhan terhadap peraturan perpajakan. Namun, oleh karena tingkat kepatuhan (dan ketidakpatuhan) terhadap peraturan perpajakan dapat mempengaruhi ketersediaan kapital bagi investasi sektor swasta, kebijakan ekspansi fiskal yang dibiayai dengan penegakan aturan perpajakan yang berlebihan harus memperhatikan dengan seksama keterbatasan produktivitas investasi sektor publik.
	This article aims to assess the consequences of tax noncompliance on Indonesia's economic growth in the perspective of the endogenous growth theory. The assessment is achieved by comparing the marginal productivity of public sector investment (which is mostly financed by tax revenues) with the marginal productivity of private sector investment (which could be financed by the proceeds available from nonconformity to tax laws). Empirical results in this study show that private sector investment has higher productivity than public sector investment. Further, it seems that the role of private investment in the process of economic growth is much larger and more important than public investment and these results are robust across several regression specifications. These do not necessarily mean that tax noncompliance should be left uncontrolled by the tax authority. However, since the extent of tax compliance (or noncompliance) may affect the availability of capital to be used for investment by the private sector, it is therefore suggested that expansionary fiscal policies financed through excessive tax enforcements may need to carefully consider the productivity constraints that might be faced by public sector investments.

1.   INTRODUCTION

1.1. Background of Study

Generally, there are two ways in which compliance to taxation may affect economic growth. On the one hand, taxes provide government with resources to finance the supply of public goods. If these financial resources were spent on productive activities, they would speed the accumulation of capital across sectors of the economy (Barro, 1990; Turnovsky, 1997). Since private agents are not charged by the use of public goods such as roads or public education, government spending can create positive externalities for the private sector in the form of a relatively high marginal productivity from private capital. In standard production functions, higher marginal productivity of capital would lead to higher output and thus make perpetual capital accumulation possible (Caballé & Panadés, 1997; Ercolani & e Azevedo, 2014).

On the other hand, taxes might distort the accumulation of capital in the private sector of the economy. Capital accumulation is influenced by savings rate and the rate of savings is influenced by, among others, taxes. Taxation is one of the essential factors affecting the rate of savings because its impact on the return savers receive in exchange for delaying consumption (Feldstein, 2009, p. 1). Studies in the framework of standard growth models with infinite time horizon generally found that high tax rates on income can be associated with low economic growth (see, for example, in Lucas (1988, 1990); Rebelo (1990)).

Therefore, striking the right balance between financing public spending and minimizing the disincentive to capital accumulation – hence, economic growth – might be a perennial challenge for any government trying to design pro-growth tax policies. At one extreme economic growth would be restricted when the share of government in the economy is zero percent; while at the other extreme, economic growth would also be limited when government's share in the economy is closer to 100 percent. In the former, the economy would be in a state of chaos since there are no rule of law, protection of property rights, etc.. In the latter, economic growth would be hampered by, among others, distortions in economic agents' decision due to the excess burdens of taxation imposed to finance the increasing government's activities, distortions in the incentive systems, crowding-out effects and government inefficiencies (Afonso & Jalles, 2011; Bajo-Rubio, 2000; Barro, 1991).

2.   LITERATURE REVIEW AND HYPOTHESIS

This paper 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.

2.1.   Government's share in the Indonesian economy

Barro (1989) proposed a theoretical framework in which to analyze the impact of public expenditures and taxation on the long-run rates of economic growth and savings. One of the crucial concepts in the framework of Barro (1989) was that in order to maximize the rate of economic growth, the marginal productivity of public expenditure should equal to one. Empirical studies within this framework, however, have provided mixed results. For example, Karras (1997) examined panel data from 20 European countries and suggested that the optimal share of public expenditure for maximum economic growth should be around 16 percent of the economy. Another example, analyzing data from 20 transition countries, Gunalp and Dincer (2005) found that the optimal share of government in these countries should be around 17 percent.

Friedman (1997) argued that government has positive contribution in an open and free society but this contribution would become negative when public share increases from 15 percent to 50 percent of GDP. Hence, Friedman (1997) suggested that the threshold for an optimal level of public spending is between 15-50 percent of national income, depending on the level of development of a country. Thanh and Hoai (2015) studied the relation between the size of government and economic growth in ASEAN countries, including Indonesia. Empirical results of their study showed that for these countries, the optimal threshold for the size of government in these economies was 25.69 percent of GDP. Hence, they suggested that increasing government spending would promote economic growth when the size of the government was below this threshold. On the other hand, economic growth would be impeded when the size of the government was above the threshold.

Data for Indonesia show that public expenditures as a percentage of GDP increased significantly since the early 2000s, as shown in Figure 1. In period 1993-1999 government spending was, on average, 14 percent of GDP, whereas in period 2000-2013 the share had increased to 18 percent. Nevertheless, the size of Indonesian government in the economy was below the threshold as suggested by Thanh and Hoai (2015) and still between the optimal threshold as suggested by Friedman (1997). Hence, these data might suggest that there is still room to increase the size of the Indonesian government without impeding economic growth.

As seen in Figure 1, the majority of Indonesian government's spending was financed from tax revenues. For the period 1993-2013, on average, 65 percent of government spendings were financed from taxation. However, increasing taxes to finance increases in government spending may pose some risks and one of them is the increasing tax evasion due

to higher tax rates. Most experimental and econometric research found positive association between higher tax rates and greater evasion. Manipulations through varying tax rates in laboratory experiments frequently found that increases in tax rates lead to decreases in compliance (Alm, Jackson, & McKee, 1992; Collins & Plumlee, 1991; Friedland, Maital, & Rutenberg, 1978; Park & Hyun, 2003). Similarly, empirical research often found that higher marginal tax rates could be associated with increases in tax noncompliance (Clotfelter, 1983; Pommerehne & Weck-Hannemann, 1996; Slemrod, 1985).
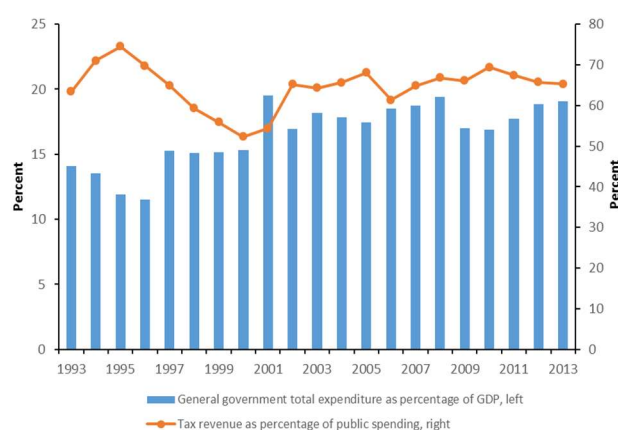

Figure 1. Public expenditures and tax revenues in Indonesia
Sources: Bank Indonesia (Various Years); World Economic Outlook (2016), analyzed.

Moreover, increases in tax rates could exacerbate the problems of underground economy. The experiences of Chile under Salvador Allende and of Peru under Alan Garcia may serve as precaution against 'macroeconomic populism' (Dornbusch & Edwards, 1990). Emphasizing the policies of economic growth and income redistribution while deemphasizing the risks of deficit financing, both countries embarked on strong expansionary policies which involved the transfer of massive subsidies. This resulted in the deteriorations of budget deficits and increases in tax revenues were required to plug the gap. Efforts to increase tax revenues, however, were futile as economic activities massively moved out of the official economy and entered the underground economy – which, by its nature, is very hard to tax. This condition may prompt a vicious cycle: As sources of tax revenue are moving underground, budget deficits widens, requiring the government to increase the tax rates further. These increases in tax rates encourage more and more sources of tax revenue to move into the underground economy, depriving tax revenues and widening the budget deficits further.

The tax rates, however, may not be the only factor affecting tax compliance and the next section provides an overview these other factors.

2.2. Causes of Tax Noncompliance

Tax noncompliance is a universal and important subject which frequently serves as a major preoccupation of taxpayers, tax policy designers, tax administrators and the general public (Ahmad & Stern, 1989). The term 'underground economy', among others, has been coined to depict those part of the economy concealed from tax authority. Legally, tax noncompliance consists of avoidance and evasion activities with the difference between them is that the former does not 'break the law' in some sense and the latter does. In public finance perspective, however, both activities have the same effect: A dollar lost revenue through tax avoidance is the same as a dollar lost revenue through tax evasion (Merks, 2006).

Within the tradition of tax compliance studies, some factors – in addition to the level of tax rates as discussed previously – have been suggested as important in explaining noncompliance (see, for example, Kirchler, Hoelzl, & Wahl, 2008). Overview of the available literature of these factors is as follow:

2.2.1. Probabilities of Audit

Theoretically, higher probabilities of tax audit should be able to deter taxpayers from noncomplying to tax laws since there would be higher probabilities that they would get caught. Nevertheless, although available studies found that audit probability may affect the levels of compliance, they generally concluded that the relationship was, at best, weak. Literature review by Fischer, Wartick, and Mark (1992) revealed inconsistent findings on the association between audit probabilities and tax compliance.

From a field experiment, Slemrod, Blumenthal, and Christian (2001), examined how increases in the probability of audit may affect taxpayers' compliance behaviors. They found that threats made to 'closely examine' taxpayers' returns increased compliance but only for low and middle-income taxpayers, while the opposite effect could be observed for high-income earners.

By varying the probability of audit in a laboratory setting, Spicer and Thomas (1982) found that precise information on the percentage of audit probabilities (instead of indicating high, middle and low probabilities) given to taxpayers has low negative effects on noncompliance. Other experiments, however, found that increases in tax compliance could be observed when imprecise information on the probabilities of audit were provided to taxpayers (for example in the work of Friedland, 1982). In general, it is not uncommon for survey studies to find weak (at times, even non-significant) positive correlation between audit probabilities and compliance (see, for example, in Mason and Calvin (1978); Song and Yarbrough (1978); Spicer and Lundstedt (1976); Wärneryd and Walerud (1982)).

2.2.2. Fines

The magnitude of fines has been proposed as one of the factors affecting compliance with increased penalties was argued as one of the deterrents to evasion (Jackson & Jones, 1985). However, empirical studies on the relation between fines and tax compliance have provided less than clear results. Fischer et al. (1992) examined the available literature and concluded that there are inconsistent findings on this subject. Some experiments, for example in the work of Park and Hyun (2003), found that fines has a higher deterrence effect than audit probabilities. Another example, an experiment conducted by Friedland et al. (1978) found that noncompliance decreased significantly when there were higher fines, while higher audit probabilities did not have the same effect.

On the other hand, other experiments found that compliance was weakly related to the level of fines. Friedland (1982) experimented with game simulation and found that the size of fines were less effective to deter noncompliance behavior while increases in the probability of being fined was more effective in deterring noncompliance. Further, an experiment conducted by Webley, Robben, Elffers, and Hessing (1991 p. 51) found that there was no evidence to support the argument that large fines lead to less tax noncompliance.

2.2.3. Tax Knowledge and Participation

A relatively large body of literature seemed to confirm that tax compliance is positively related to the extent of tax knowledge among citizens. From an empirical study, Niemirowski, Baldwin, and Wearing (2003) maintained that tax compliance behavior was significantly related to tax-based values, beliefs, attitudes and knowledge. Further, without considering the content of one's education, some research found that knowledge about taxation would increase as citizens' education got longer; in other words longer education can be associated with more knowledge about taxation (Kinsey & Grasmick, 1993; Song & Yarbrough, 1978; Spicer & Lundstedt, 1976; Vogel, 1974). In an experiment conducted to assess the relation between tax knowledge and compliance, Eriksen and Fallan (1996) concluded that, controlling for the tax knowledge of the subjects, additional knowledge about tax rules has the effects of decreasing tax evasion and increasing tax compliance. In a similar token, other research suggested that combining higher knowledge on taxation with reduced tax complexities would improve compliance (Clotfelter, 1983; Groenland & Van Veldhoven, 1983; Kirchler & Maciejovsky, 2001; Park & Hyun, 2003; Wahlund, 1992; Wärneryd & Walerud, 1982).

Moreover, the degree of citizens' participation in the political processes concerning fiscal matters – particularly political decisions on taxation to finance government budget – may affect the levels of compliance. When citizens have higher degree of influence over budgeting processes, then it would be more likely for them to learn more about the tax systems and to consider the long-run consequences for noncompliance behaviors (Feld & Frey, 2002). Thus, direct democracies were argued to have positive effects on tax compliance (Kirchler et al., 2008). For example, Pommerehne and Weck-Hannemann (1996) studied how different levels of political participation in different cantons in Switzerland may affect the levels of tax compliance in those cantons. Their study found that in cantons where citizens can directly influence the budgetary legislations, tax compliance tended to be higher than in cantons where citizens lacked such influence.

Direct democracy is also argued to be able to generate different types of communications among citizens and also between citizens and their representatives compared to the purely representative political systems. In a direct democracy, citizens have the incentives to collect more information since they have to decide political issues (such as fiscal policy) for themselves. Further, in direct democracies tax increases would be relatively easier to be accepted by the public when informed citizens perceive that increases in government expenditures are justified (Frey & Kirchgässner, 2002 as cited in Kirchler et al., 2008). As such, tax evasion in direct democratic systems is argued to be lower than in representative systems because the citizens feel more responsible for their society (Feld & Kirchgässner, 2000).

2.2.4. Attitudes Toward Taxes

Studies in the field of economic psychology have proposed attitudes as one of the factors affecting tax compliance. Reasoned action theory (Fishbein & Ajzen, 1975) and planned behavior theory (Ajzen, 1991) maintained that one of the determinants of behavior is attitudes. In both theories, it is assumed that attitudes stimulate people to act according to their positive or negative evaluations regarding an object. Hence, higher noncompliance could be expected when a taxpayer has positive attitude toward tax noncompliance. Some research suggested that positive attitude toward tax noncompliance was quite common. For example, results from survey conducted by Orviska and Hudson (2003) found that large proportion of population condoned tax noncompliance behavior. Similarly, in a controlled experimental study of tax compliance conducted by Trivedi, Shehata, and Mestelman (2004), positive attitudes toward tax noncompliance could be identified among participants, particularly when they perceived that there was a genuine reason for certain noncompliance behavior such as a condition of economic distress.

Weigel, Hessing, and Elffers (1987) proposed a model of tax evasion behavior which incorporated social and psychological aspects such as attitudes and moral beliefs. Nevertheless, examinations of data on

fined noncompliant tax payers and honest tax payers suggested that although attitudes might partially explain the self-reported noncompliance, they were statistically insignificant as predictors of actual noncompliance behavior. Further, although self-reported noncompliance correlated significantly with attitudes, this correlation was fairly weak. These results may suggest that evidence on the relation between attitudes toward taxes and tax noncompliance provides mixed results. However, there might be some grains of truth in what Lewis (1982, p. 177) said: "we can be confident in our general prediction that if tax attitudes become worse, tax evasion will increase''.

2.2.5. Personal, Social and National Norms

Norms have also been proposed as one of the important factors explaining tax compliance since they affect the behavioral intentions of individuals (Ajzen, 1991; Fishbein & Ajzen, 1975). Kirchler et al. (2008) defined norms as behavioral standards which prevailed at three different levels: Individual, social and national levels. On individual level, Kirchler et al. (2008) argued that individual norms were affected by, among others, moral reasoning, egoism and values. Several authors argued that individual norms, values and tax ethics are interconnected thus voluntary compliance would be more likely for individuals with more developed moral reasoning or tax ethics (Baldry, 1987; Jackson & Milliron, 1986; Trivedi et al., 2004).

On the social level, reference group (such as friends and acquaintances) may affect a taxpayer's compliance behavior (Wenzel, 2005). It would be likely for a taxpayer to not comply to tax laws if he believes that noncompliance is extensive and it is an accepted behavior in his reference group (Kirchler et al., 2008). Through an in-depth, semi structured interviews, Sigala, Burgoyne, and Webley (1999) proposed that social norms were among the most important factors explaining taxpaying behaviors. On the national level, norms developed into cultural standards and actual law often reflected these standards (Kirchler et al., 2008). When favorable national norms exist, trust in political leadership and administration would spur voluntary compliance (Fjeldstad, 2004; Pommerehne & Frey, 1992).

2.2.6. Perceived Fairness

Enquiries into a tax system often revealed public concern over issue of fairness, i.e. whether the wealthy and privileged classes of the society pay their fair share of taxes (Braithwaite, 2003; Hobson, 2002). Wenzel (2005) argued that fairness can be classified into three areas: Distributive justice, procedural justice and retributive justice.

In the perspective of distributive justice, tax compliance would likely to decrease when individuals or income groups perceive that their tax burden are heavier than other individuals or groups with similar economic capacity (De Juan, Lasheras, & Mayo, 1994;

Spicer & Becker, 1980; Spicer & Lundstedt, 1976). Further, if taxpayers believe that the national tax systems are unfair then compliance would likely to be low (Cowell, 1992). Within the perspective of procedural justice, T. R. Tyler and Lind (1992) maintained that neutrality of procedures, trustworthiness of the tax authority as well as polite, dignified and respectful treatment for taxpayer were essential in influencing taxpayers' perception of fairness.

Regarding retributive justice, perceptions of excessive and unfair retributive justice (such as intrusive audits and unfair penalties) may lead to increased distrust and negative attitudes toward the tax authority specifically as well as toward the tax systems generally. In the end, these negative perceptions could result in deteriorations of compliance (Spicer & Lundstedt, 1976; Wenzel & Thielmann, 2006).

2.2.7. Trust

Kirchler et al. (2008) suggested that taxation conditions in a society could lay on a continuum between antagonistic climate and synergistic climate. When the tax climate in a society is antagonistic, taxpayers and tax authority will work against each other. This condition is characterized by an attitude of "cops and robbers" (Kirchler et al., 2008, p. 211) – tax authority regards taxpayers as 'robbers' who have to be held in check because they will try to evade paying taxes whenever there are chances. On the other side, taxpayers perceive that they are being persecuted by the tax authority ('cops') and feel that noncompliance is the right thing to do. This climate is characterized by large societal distance in which, on the one side, authority has little respect and little positive feeling toward individuals and, on the other side, taxpayers resort to 'rational' weighing on the benefits and costs of nonconforming to tax laws thus leading to negligible voluntary compliance.

In a synergistic climate, the attitude can be described as "service and client" (Kirchler et al., 2008, p. 211) – the existing perception is that tax authority and taxpayers are belong to the same community and that in its job to collect taxes, the tax authority has a feeling that it performs a service for the community. Tax authority treats taxpayers respectfully and supportively as well as ensures transparent procedures in all taxation aspects have been followed. This climate is characterized by a low social distance and tax compliance is likely to be high since taxpayers, out of a sense of obligation, tend to pay their fair share of taxes and less likely to contemplate the chances of not conforming to tax laws.

To sum up, when a government aims to maximize economic growth, its policymakers need to understand how the decisions they make may affect the compliance behaviors of the taxpayers. Changes in factors affecting tax compliance might translate into changes in the levels of evasion and this may lead to

changes in economic growth (Alm, 2012; Alm & Jacobson, 2007; McClellan, 2013). Hence, how tax noncompliance may affect Indonesia's economic growth will be discussed in the next section.

2.3. Tax Noncompliance and Economic Growth

Tax noncompliance is often viewed as a significant problem because it causes shortfalls in government revenues, hence weakens government's ability to provide public goods and services. Ultimately, inadequate provisions of public goods and services may hamper economic growth. This perspective, however, is not the only approach to examine the impact of noncompliance on economic growth. Resources spent in dealing with noncompliance might be warranted if noncompliance created a drag on economic growth. On the other hand, if noncompliance enabled the private sector to invest in productive assets than otherwise could be wasted by the government – via inefficiency or corruption, for example – then noncompliance might deserve a more benign scrutiny (McClellan, 2013).

Within the framework of the endogenous growth model, theoretical studies have examined the effects of tax compliance and evasion on economic growth. Wrede (1995) employed an overlapping generations (OLG) model to examine the impact of tax evasion on economic growth in the long run. His model showed that if tax revenues were spent on increasing the productive capacity of the economy, then tax evasion may adversely affect the long-run growth rate of the economy. In contrast, if the government spent its tax revenues on consumptions rather than productive assets, then its effects on economic growth would be ambiguous since it depends on the inter-temporal elasticity of substitution between capital and labor. If the elasticity equals one, then long-run growth will not be affected by tax evasion. If the elasticity is lower (higher) than one, an increase in enforcement parameters will shift long-run capital-labor ratio upwards (downwards).

Caballé and Panadés (1997) used OLG model within the framework of rational criminal behavior theory to explain the effects of changes in the tax enforcement policies on economic growth. Their study showed that the effects of greater enforcement efforts on growth depend on the relative productivity of private capital vis-à-vis public capital. When private capital is more productive, increases in enforcement efforts may reduce growth. On the other hand, when public capital is more productive, greater enforcement would increase economic growth.

In his study, Eichhorn (2004) built a model which assumed that government spending is purely consumptive, therefore has no impact whatsoever on growth. Under this assumption, evading tax would leave households with higher amounts of income for saving, thus in a general, macro perspective the evasion could be beneficial for economic growth. Nevertheless, when government reacts to evasion by increasing the tax rate then the impact of tax evasion on growth would be neutral.

Gahramanov (2009) employed OLG model to analyze the effects of income tax evasion, which arose from a low penalty rate, on economic growth. It showed that when the fines imposed on tax evasion was set at a sufficiently small rate, the economy may face an over-accumulation of capital and this would result in unsustainable growth. One of the implications of the study is that in an economy where the savings rate exceeds the golden-rule level, increasing the enforcement mechanisms for concealed tax liabilities could adversely affect the accumulation of capital and thus might bring the economy back to a more balanced growth path.

Freire-Serén and i Martí (2013) took into account the role of the accumulation of human capital in intensifying tax evasion. In their model, taxpayers were assumed to be able to improve their ability to evade taxes by investing in human capital. Hence, tax evasion could positively or negatively affect economic growth depending on the intensity of evasion, i.e. the productivity of human capital in evading taxes, and also depending on the value of the nominal tax rates. One of the implications of their model is that when the nominal tax rates are set at low levels, human capital accumulation could reduce economic growth if taxpayers (using their accumulated investment in human capital) intensify their efforts to evade taxes, for example by employing more sophisticated, aggressive tax planning.

While a wide body of literature has focused its attention on the theoretical studies on the effects of tax noncompliance on economic growth by building models, empirical studies on this subject is much sparser. Nevertheless, it can be inferred from the theoretical literature that tax noncompliance may affect economic growth through its impact on, among others, capital accumulation. Further, the transfer mechanism for this impact may depend on the relative marginal productivity of capital of the government sector vis-à-vis of the private sector. In other words, the effect of tax noncompliance on economic growth may be determined by which party, public or private, that can provide the greatest returns to capital.

2.4. Tax Noncompliance and Capital Accumulation in Indonesia

As suggested by the theoretical literature discussed previously, tax noncompliance may affect the accumulation of capital. This is because the proceeds gained from nonconforming to tax laws could be invested by private agents, thus increasing private sector's capital accumulation. However, it is difficult to determine the cause of increases or decreases in capital accumulation as solely the result of tax noncompliance since many other factors could affect them. Nevertheless, an examination on the patterns of tax noncompliance with the patterns of private capital investment for the same period might

provide some insights into the effects of noncompliance on capital accumulation.

Figure 2 exhibits Indonesia's Value Added Tax (VAT) noncompliance and Gross Fixed Capital Formation (GFCF) of the private sector. Both data are measured at constant 2010 prices. Data on VAT noncompliance are from Iswahyudi (2017) who defined the VAT gap due to noncompliance as the difference between the actual VAT revenue collected by the government and the VAT total theoretical liability. Iswahyudi (2017) employed national accounts figures (Input – Output table) to estimate the theoretical VAT liability generated by different sub-aggregates of the economy. GFCF data from the Indonesian Central Board of Statistics cover yearly gross capital outlays (thus reflect investment).
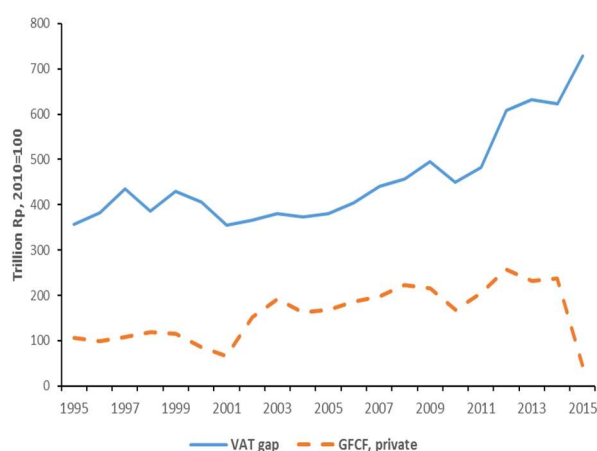

Figure 2. VAT gap and private capital investment
Sources: Indonesia Central Board of Statistics (Various Years); World Development Indicators (Various Years); Iswahyudi (2017), analyzed.

The VAT gap may serve as a benchmark for gauging the level noncompliance to the tax laws in general. This is because noncompliance to VAT tends to be followed by noncompliance to other taxes, particularly the income tax. Theoretically, the invoice-and-credit design of VAT would make noncompliance to this tax instrument easier to detect than other types of tax instruments. Hence, Iswahyudi (2017) argued that "...when taxpayers failed to report or underreport their VAT liabilities, it is likely that they would also fail to report or underreport their income tax liabilities in order to avoid detection."

The graph in Figure 2 shows that noncompliance and capital investment moved generally in the same direction for the majority of period 1995-2013. It was in 2014 and 2015 that both were moving at opposite directions. These were years when Indonesia experienced slower economic growth. Previously, the annual average growth during 2010-2013 was 6 percent. In 2014 the growth slowed to 5 percent and in 2015 it slowed even more and only reached 4.7 percent. It is likely that during times of slow economic growth capital investment would also decline while tax noncompliance may continue its increasing trend.

This might partially explain the divergent paths of noncompliance and private investment in 2014 and 2015.

Figure 3 presents the correlation between noncompliance and private capital investment which shows a positive slope. Nevertheless, the coefficient of correlation between these two is found to be 0.28, indicating a weak relation. It could be inferred that for the period under study, the data show that increases in tax noncompliance is weakly related to increases in capital accumulation. Hence, periods of high tax noncompliance might not necessarily translate into higher accumulation of capital (or investment) by the private sector and vice versa.
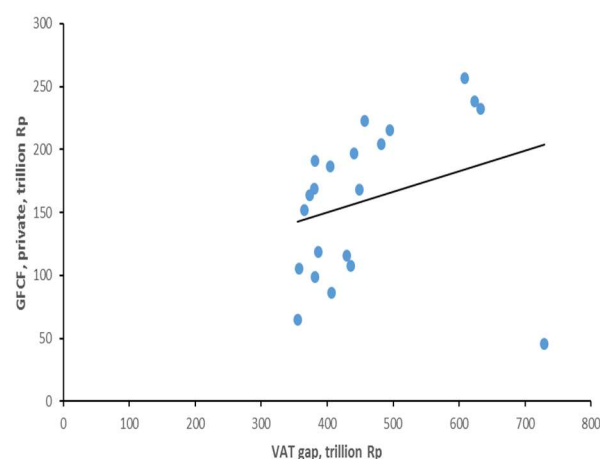

Figure 3. Correlation between noncompliance and private capital investment
Sources: World Development Indicators (Various Years); Iswahyudi (2017), analyzed.

Tax compliance, on the other hand, could provide the government with the necessary funds to finance investments in the public sector such as roads, bridges, schools, etc.. These public sector's capital accumulations would improve labor's productivity in the economy. Increased economic productivity would induce a country to look beyond its borders in order to expand its markets and this would, in turn, spur international trade through exports and imports. Hence, the impact of tax compliance (or noncompliance) on the economy may significantly depend on how productive the government utilizes the proceeds collected from tax revenues, which, in turn, depends on the extent of tax compliance (or noncompliance) among its citizens.

2.5. Hypothesis

The result shown in Figure 3 may indicate that the economic effect of tax noncompliance may depend more on how the available capital is utilized, rather than its impact on capital accumulation *per se*. Since a tax basically transfers resources from private sector to public sector, examinations on how productive both parties utilize their available capital resources may be crucial. Hence, the null hypothesis developed in this

paper is that the marginal productivity of private investment is equal to the marginal productivity of government investment.

3. RESEARCH METHODOLOGY

As the effect of noncompliance on economic growth may depend on which party – private sector or government sector – that has higher marginal productivity of capital, this section discusses the marginal productivity of both sectors. The model employed here follows that of Khan and Reinhart (1990), with the production function in the economy is assumed to be as follows:

$$Y = A \cdot F(K, L, Z) \qquad (1)$$

where Y, A, K and L denote the levels of output, factor productivity, capital stock and labor input, respectively. Z is a vector which denotes other factors affecting economic growth. In this model, factor productivity is assumed to grow at a constant (exogenous) rate.

Labor force is one of the essential elements in the production of output (Solow, 1956). Hence, the growth of labor force would translate into increases in economic output. Increases in output would, in turn, increase the levels of investment.

For Z, Khan and Reinhart (1990) used exports and imports as independent variables. As argued by, among others, Balassa (1978), W. G. Tyler (1981) and Ram (1985), growth of exports may facilitate development of other goods and services, thus expanding the output of the economy. Export activities could also boost firms' efforts to increase productivity through investments in new machinery, technology, or products since these firms need to be competitive in international markets (Isaksson, 2007).

Imports are also important for developing countries, such as Indonesia, due to their heavy reliance on the imports of capital and intermediate goods as inputs into production, thus growth in import activities may spur investment or capital accumulation (Bardhan & Lewis, 1970). Further, investments in new technology could be encouraged by the growth of imports since foreign (and relatively advanced) technology could be introduced into domestic production by import activities (Mayer & Mayer, 2001).

Equation (1) can thus be rewritten in growth terms as:

$$dY/Y = a_0 + a_1 I/Y + a_2 dL/L + a_3 dZ/Z \qquad (2)$$

where a_0 is productivity growth (Total Factor Productivity) and assumed to be constant, a_1 denotes the marginal productivity of capital, I is the growth in investment ($I = dK$). a_2 and a_3 are the elasticities of output with respect to labor and other factors, respectively.

To test the relative marginal productivity of private sector investment and public sector investment, I can be split into I_p and I_g, while the growth of exports and imports[†] are used alternatively to arrive:

$$dY/Y = b_0 + b_1 I_p/Y + b_2 I_g/Y + b_3 dL/L \qquad (3a)$$
$$+ b_4 dX/X$$

and

$$dY/Y = b_0 + b_1 I_p/Y + b_2 I_g/Y + b_3 dL/L \qquad (3b)$$
$$+ b_4 dM/M$$

where b_1 and b_2 are the marginal productivity of the private sector and public sector respectively, while I_p/Y and I_g/Y are the corresponding rates of investment. If investment in the private sector is more productive than investment in the public sector then $b_1 > b_2$, vice versa. X denotes the volume of exports and M denotes the volume of imports.

Data for Equation (3a) and (3b) were compiled from the Statistical Yearbook of Indonesia published yearly by the Indonesian Central Board of Statistics as well as from the World Development Indicators of the World Bank and cover the period 1995-2015.[‡] Total GFCF is deducted by public sector's GFCF (data for both are available in the Indonesian Central Board of Statistics' publications) to arrive at private sector's GFCF.

4. RESULTS AND FINDINGS

Statistical results of the regression specifications are reported in Table 1. The first two equations in the table treat total investment as independent variable in the growth model. When the growth of exports is treated as the third independent variable, it is found that the coefficient of total investment has the correct sign and statistically significant at 5 percent level of confidence. The coefficient of the growth of labor has a negative sign, nevertheless, one cannot make too much of this sign. At best all that can be said is that the growth of labor as well as exports and, more importantly, factor productivity do not seem to exert significant effect on the growth of output.

In the case where the specification incorporates the growth of imports, as proxy for imported inputs, the coefficient of total investment rises and continues to be significant. As in the case of exports as explanatory variable, the growths of imports, labor and factor productivity have insignificant effects on output growth. Moreover, the fit of the equation is reduced once the growth of imports is included in the equation.

[†] Following Khan and Reinhart (1990), it is assumed that the proportion of imported inputs from total imports is at a constant rate.

[‡] Some missing data are estimated using moving average method.

The results so far show that a one percent increase in total investment would raise output by around 0.3 percentage point. Private and public investment is aggregated into total investment to provide a benchmark against which to compare the results when both sources of investment are disaggregated. Hence, one would be able to examine whether this marginal productivity comes from investment in private sector or public sector, as specified in Equations (3a) and (3b).

Results for the equations in Table 1 show that investment in the private sector consistently has higher marginal productivity than public sector investment. Furthermore, it is found that private investment has significant impact on output growth, while the impact of public investment on output growth is statistically not significant. These results may suggest that private sector investment has a more prevalent direct effect on output growth than public investment.

Table 1. Regression results

Constant	Total Investment	Private Investment	Public Investment	Growth of Labor	Growth of Exports	Growth of Imports	R^2	S.E.
3.184	0.301*	--	--	-0.155	0.041	--	0.381	4.666
2.795	0.334*	--	--	-0.145	--	-0.002	0.372	4.701
3.598*	--	0.264*	0.008	-0.158	0.025	--	0.423	4.643
3.302*	--	0.296*	0.013	-0.150	--	-0.012	0.422	4.649
3.704*	--	0.253*	--	-0.157	0.031	--	0.421	4.514
3.445*	--	0.275*	--	-0.147	--	-0.004	0.416	4.534

Note: * significant at 5% level of confidence, R^2 is the coefficient of determination, S.E. is the standard error. Sources: Indonesia Central Board of Statistics (Various Years); World Development Indicators (Various Years); analyzed.

What is interesting is that when investment is separated into private sector and public sector, the productivity coefficients show sizeable increases and become statistically significant. This separation of investment also improves the explanatory power of the models. To test whether these increases in factor productivity have something to do with private investment, further analyses on Equations (3a) and (3b) were done by leaving the variable of public investment out of the specifications, thus allowing $b_2 = 0$.

Regression results in Table 1 indicate that public investment is statistically insignificant, thus omitting this variable does not seem to affect the overall goodness-of-fit of the models. When the growths of exports and imports are used alternatively, the coefficient of private investment still maintains its significance. These results underline the importance of the direct effects of the marginal productivity of private investment on output growth. As an additional note, the lack of statistical significance of the growths of labor, exports and imports is maintained in all of the equations presented in Table 1.

All in all, the regression results demonstrate that for the case of Indonesia – at least for the period under study – the marginal productivity of private investment seems to be higher than the marginal productivity of public investment. This higher productivity of private investment could be linked to tax noncompliance as follows: Since the consequences of tax noncompliance could be severe for taxpayers, they would have the incentives to utilize the proceeds gained from tax noncompliance in the best possible way so that the marginal revenues from investments financed from tax noncompliance are higher than the taxes and the fines that they would have to pay in a condition of complete compliance. When these marginal revenues are lower than the taxes avoided, taxpayers would rather pay the full amount of taxes due rather than facing the consequences of noncompliance.

5. CONCLUSIONS

This paper has assessed the effects of tax noncompliance on capital accumulation and on economic growth within the framework of the endogenous growth theory. It is found that the economic effect of tax noncompliance may depend more on how the available capital is utilized, rather than its impact on capital accumulation *per se*. Empirical results in this paper show that private investment has higher productivity than public investment. Further, public investment is found to have no statistically significant effect on economic growth, which may indicate the suboptimal utilization of capital in the public sector. Since the extent of tax compliance (or noncompliance) may affect the availability of capital to be used for investment by the private sector, it is therefore suggested that expansionary fiscal policies financed through excessive tax enforcements may need to carefully consider the productivity constraints that might be faced by public sector investments.

6. IMPLICATION AND LIMITATION

This paper found that the role of private investment in growth process seems to be much larger and more important than public investment

and these results are robust across several specifications. Nevertheless, these do not necessarily mean that tax noncompliance should be left uncontrolled by the tax authority. It does mean, however, that a rather benign approach could be exercised in dealing with tax noncompliance considering the importance of private investments in the economic growth and the relatively poor marginal productivity of public investments.

Careful considerations should be exercised in interpreting the results of this paper, however, since there are qualifications to the model employed here (Khan and Reinhart, 1990). First, the model only examines the direct effects of private and public investments. Economic growth, however, can be indirectly affected by public investment. Public expenditures on essential infrastructures such as roads, electricity, telecommunications and schools as well as on human capital (education) can strongly influence the levels and productivity of private sector's capital investments. In other words, private investments may suffer when there are eliminations or reductions in public investments. Second, public sector investments may also have negative effects on growth. Expansions in public investments – whether financed through tax increases, debt issuances, or inflation – may crowd out physical and financial resources available to the private sector and thus depressing private investment activities. However, if consideration is only given to the direct effects of private and public investments, then careful evaluations on the optimum level of government spendings in the economy might need to be exercised. Hence, the central thesis of this paper is that expansionary fiscal policies financed through excessive tax enforcements may need to consider the productivity constraints of public sector investments.

REFERENCES

Afonso, A., & Jalles, J. T. (2011). Economic performance and government size. *European Central Bank Working Paper Series*.

Ahmad, E., & Stern, N. (1989). *Taxation for developing countries* (Vol. 2): North-Holland.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, 50*(2), 179-211.

Alm, J. (2012). Measuring, explaining, and controlling tax evasion: lessons from theory, experiments, and field studies. *International Tax and Public Finance, 19*(1), 54-77.

Alm, J., Jackson, B. R., & McKee, M. (1992). Estimating the determinants of taxpayer compliance with experimental data. *National Tax Journal*, 107-114.

Alm, J., & Jacobson, S. (2007). Using laboratory experiments in public economics. *National Tax Journal*, 129-152.

Bajo-Rubio, O. (2000). A further generalization of the Solow growth model: the role of the public sector. *Economics Letters, 68*(1), 79-84.

Balassa, B. (1978). Exports and economic growth: further evidence. *Journal of development economics, 5*(2), 181-189.

Baldry, J. C. (1987). Income tax evasion and the tax schedule: Some experimental results. *Public Finance= Finances publiques, 42*(3), 357-383.

Bank Indonesia. (Various Years). *Indonesian Financial Statistics*. Retrieved from: http://www.bi.go.id/en/statistik/seki/terkin i/keuangan-pemerintah/Contents/Default.aspx

Bardhan, P., & Lewis, S. (1970). Models of growth with imported inputs. *Economica*, 373-385.

Barro, R. J. (1989). A Cross-Country Study of Growth, Saving, and Government: National Bureau of Economic Research, Inc.

Barro, R. J. (1990). Government Spending in a Simple Model of Endogeneous Growth. *Journal of political Economy*, S103-S125.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics, 106*(2), 407-443.

Braithwaite, V. (2003). Perceptions of who's not paying their fair share. *Australian Journal of Social Issues, 38*(3), 335-362.

Caballé, J., & Panadés, J. (1997). Tax Evasion and Economic Growth. *Public Finance/Finances Publiques, 52*(2), 318-340.

Clotfelter, C. T. (1983). Tax evasion and tax rates: An analysis of individual returns. *The Review of Economics and Statistics*, 363-373.

Collins, J. H., & Plumlee, R. D. (1991). The taxpayer's labor and reporting decision: The effect of audit schemes. *Accounting Review*, 559-576.

Cowell, F. A. (1992). Tax evasion and inequity. *Journal of Economic Psychology, 13*(4), 521-543.

De Juan, A., Lasheras, M. A., & Mayo, R. (1994). Voluntary tax compliant behavior of Spanish income tax payers. *Public Finance= Finances publiques, 49*(Supplement), 90-105.

Dornbusch, R., & Edwards, S. (1990). Macroeconomic populism. *Journal of development economics*(32), 247-277.

Eichhorn, C. (2004). *Tax Evasion and Economic Growth–A Neutrality Result*. Unpublished Working Paper. University of Munich.

Ercolani, V., & e Azevedo, J. V. (2014). The Effects of Public Spending Externalities. *Journal of Economic Dynamics and Control, 46*, 173-199.

Eriksen, K., & Fallan, L. (1996). Tax knowledge and attitudes towards taxation; A report on a quasi-experiment. *Journal of Economic Psychology, 17*(3), 387-402.

Feld, L. P., & Frey, B. (2002). Trust breeds trust: How taxpayers are treated. *Centre for Tax System Integrity Working Paper No. 32 Australian*

National University and Australian Taxation Office.

Feld, L. P., & Kirchgässner, G. (2000). Direct democracy, political culture, and the outcome of economic policy: a report on the Swiss experience. *European Journal of Political Economy, 16*(2), 287-306.

Feldstein, M. (2009). *The Effects of Taxation on Capital Accumulation*: University of Chicago Press.

Fischer, C. M., Wartick, M., & Mark, M. M. (1992). Detection probability and taxpayer compliance: A review of the literature. *Journal of Accounting Literature, 11*, 1.

Fishbein, M. A., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fjeldstad, O.-H. (2004). What's trust got to do with it? Non-payment of service charges in local authorities in South Africa. *The Journal of Modern African Studies, 42*(04), 539-562.

Freire-Serén, M. J., & i Martí, J. P. (2013). Tax avoidance, human capital accumulation and economic growth. *Economic modelling, 30*, 22-29.

Friedland, N. (1982). A note on tax evasion as a function of the quality of information about the magnitude and credibility of threatened fines: Some preliminary research. *Journal of Applied Social Psychology, 12*(1), 54-59.

Friedland, N., Maital, S., & Rutenberg, A. (1978). A simulation study of income tax evasion. *Journal of Public Economics, 10*(1), 107-116.

Friedman, M. (1997, July 8). If only the US were as free as Hong Kong. *Wall Street Journal, 9*.

Gahramanov, E. (2009). Tax Evasion and Dynamic Inefficiency. *Economics Bulletin, 29*(1), 437-443.

Groenland, E. A., & Van Veldhoven, G. M. (1983). Tax evasion behavior: A psychological framework. *Journal of Economic Psychology, 3*(2), 129-144.

Gunalp, B., & Dincer, O. (2005). The optimal government size in transition countries. *Department of Economics, Hacettepe University Beytepe, Ankara and Department of Commerce, Massey University, Auckland*.

Hobson, K. (2002). 'Say no to the ATO': the cultural politics of protest against the Australian Tax Office. *Centre for Tax System Integrity Working Paper No. 37, Australian National University and Australian Taxation Office, Canberra*.

Indonesia Central Board of Statistics. (Various Years). *Statistik Indonesia*.

Isaksson, A. (2007). *Determinants of Total Factor Productivity: A Literature Review*. UNIDO Research and Statistics Staff Working Paper, (2). United Nations Industrial Development Organization, Vienna.

Iswahyudi, H. (2017). Tax Reform and Noncompliance in Indonesia. *Journal of Indonesian Economy and Business: JIEB, 32*(2), 87-103.

Jackson, B. R., & Jones, S. (1985). Salience of tax evasion penalties versus detection risk. *Journal of the American Taxation Association, 6*(2), 7-17.

Jackson, B. R., & Milliron, V. C. (1986). Tax compliance research: Findings, problems, and prospects. *Journal of Accounting Literature, 5*(1), 125-165.

Karras, G. (1997). On the Optimal Government Size in Europe: Theory and Empirical Evidence. *The Manchester School of Economic & Social Studies, 65*(3), 280-294.

Khan, M. S., & Reinhart, C. M. (1990). Private Investment and Economic Growth in Developing Countries. *World Development, 18*(1), 19-27.

Kinsey, K. A., & Grasmick, H. G. (1993). Did the Tax Reform Act of 1986 Improve Compliance? Three Studies of Pre-and Post-TRA Compliance Attitudes. *Law & Policy, 15*(4), 293-325.

Kirchler, E., Hoelzl, E., & Wahl, I. (2008). Enforced versus voluntary tax compliance: The "slippery slope" framework. *Journal of Economic Psychology, 29*(2), 210-225.

Kirchler, E., & Maciejovsky, B. (2001). Tax compliance within the context of gain and loss situations, expected and current asset position, and profession. *Journal of Economic Psychology, 22*(2), 173-194.

Lewis, A. (1982). *The psychology of taxation, Martin Robertson*. Oxford: Martin Robertson.

Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of monetary economics, 22*(1), 3-42.

Lucas, R. E. (1990). Supply-side economics: An analytical review. *Oxford economic papers, 42*(2), 293-316.

Mason, R., & Calvin, L. D. (1978). A study of admitted income tax evasion. *Law & Society Review, 13*, 73.

Mayer, J., & Mayer, J. (2001). *Technology diffusion, human capital and economic growth in developing countries*.

McClellan, C. B. (2013). *The Consequences of Poor Tax Administration: Collections, Growth, and Corruption.* (Dissertation), Georgia State University.

Merks, P. (2006). Tax evasion, tax avoidance and tax planning. *Intertax, 34*, 272.

Niemirowski, P., Baldwin, S., & Wearing, A. J. (2003). Tax related behaviours, beliefs, attitudes and values and taxpayer compliance in Australia. *J. Austl. Tax'n, 6*, 132.

Orviska, M., & Hudson, J. (2003). Tax evasion, civic duty and the law abiding citizen. *European Journal of Political Economy, 19*(1), 83-102.

Park, C.-G., & Hyun, J. K. (2003). Examining the determinants of tax compliance by experimental data: A case of Korea. *Journal of Policy Modeling, 25*(8), 673-684.

Pommerehne, W. W., & Frey, B. S. (1992). The effects of tax administration on tax morale: Diskussionsbeitrage: Serie II, Sonderforschungsbereich 178" Internationalisierung der Wirtschaft", Universitat Konstanz.

Pommerehne, W. W., & Weck-Hannemann, H. (1996). Tax rates, tax administration and income tax evasion in Switzerland. *Public Choice, 88*(1-2), 161-170.

Ram, R. (1985). Exports and economic growth: Some additional evidence. *Economic Development and Cultural Change, 33*(2), 415-425.

Rebelo, S. T. (1990). Long run policy analysis and long run growth: National Bureau of Economic Research.

Sigala, M., Burgoyne, C. B., & Webley, P. (1999). Short Paper Tax Communication and Social Influence: Evidence from a British Sample. *J. Community Appl. Soc. Psychol, 9*, 237-241.

Slemrod, J. (1985). An empirical test for tax evasion. *The Review of Economics and Statistics*, 232-238.

Slemrod, J., Blumenthal, M., & Christian, C. (2001). Taxpayer response to an increased probability of audit: evidence from a controlled experiment in Minnesota. *Journal of Public Economics, 79*(3), 455-483.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics, 70*(1), 65-94. doi: 10.2307/1884513

Song, Y.-d., & Yarbrough, T. E. (1978). Tax ethics and taxpayer attitudes: A survey. *Public administration review*, 442-452.

Spicer, M. W., & Becker, L. A. (1980). Fiscal inequity and tax evasion: An experimental approach. *National Tax Journal*, 171-175.

Spicer, M. W., & Lundstedt, S. B. (1976). Understanding tax evasion. *Public Finance, 31*(2), 295-305.

Spicer, M. W., & Thomas, J. E. (1982). Audit probabilities and the tax evasion decision: An experimental approach. *Journal of Economic Psychology, 2*(3), 241-245.

Thanh, S. D., & Hoai, B. T. M. (2015). The Threshold of Government Size and Economic Growth for ASEAN Countries: An Analysis of the Smooth Transition Regression Model. *SOUTHEAST ASIAN JOURNAL OF ECONOMICS, 3*(1), 103-124.

Trivedi, V. U., Shehata, M., & Mestelman, S. (2004). *Attitudes, incentives, and tax compliance*: Department of Economics, McMaster University.

Turnovsky, S. J. (1997). Fiscal policy in a growing economy with public capital. *Macroeconomic Dynamics, 1*(03), 615-639.

Tyler, T. R., & Lind, E. A. (1992). A relational model of authority in groups. *Advances in experimental social psychology, 25*, 115-191.

Tyler, W. G. (1981). Growth and export expansion in developing countries: Some empirical evidence. *Journal of development economics, 9*(1), 121-130.

Vogel, J. (1974). Taxation and public opinion in Sweden: An interpretation of recent survey data. *National Tax Journal*, 499-513.

Wahlund, R. (1992). Tax changes and economic behavior: The case of tax evasion. *Journal of Economic Psychology, 13*(4), 657-677.

Wärneryd, K.-E., & Walerud, B. (1982). Taxes and economic behavior: Some interview data on tax evasion in Sweden. *Journal of Economic Psychology, 2*(3), 187-211.

Webley, P., Robben, H. S. J., Elffers, H., & Hessing, D. J. (1991). *Tax evasion: An experimental approach*. Cambridge: Cambridge University Press.

Weigel, R. H., Hessing, D. J., & Elffers, H. (1987). Tax evasion research: A critical appraisal and theoretical model. *Journal of Economic Psychology, 8*(2), 215-235.

Wenzel, M. (2005). Motivation or rationalisation? Causal relations between ethics, norms and tax compliance. *Journal of Economic Psychology, 26*(4), 491-508.

Wenzel, M., & Thielmann, I. (2006). Why we punish in the name of justice: Just desert versus value restoration and the role of social identity. *Social justice research, 19*(4), 450-470.

World Development Indicators. (Various Years). Retrieved from: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

World Economic Outlook. (2016). *World Economic Outlook Database*. Retrieved from: http://www.imf.org/external/pubs/ft/weo/2016/01/weodata/index.aspx

Wrede, M. (1995). Tax evasion and growth. *Finnish Economic Papers, 8*(2), 82-90.