

Assessing the effectiveness of law enforcement in improving tax compliance: An empirical investigation*

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Abstract

The effectiveness of tax administrations' strategy is crucial in both raising revenue and improving tax compliance. While there are various studies on the relationship between law enforcement and tax compliance, a study that empirically examines the relationship between them within an actual strategy map is lacking in the literature. In response, we set out to investigate an identified knowledge gap about whether, and precisely how effective, law enforcement may impact on taxpayers' compliance in the real world. We specifically examine how various law enforcement activities may impact upon the level of tax compliance by utilizing tax authority's administrative data.

Using the Indonesian tax authority's strategy map to derive research questions and testable hypotheses, we employed a quantitative approach using rare administrative data. We conducted extensive data collection and analysis: comprehensive 19 Key Performance Indicators (KPIs) data from a total of 352 tax offices across Indonesia were obtained, including a list of 185 tax offices which have conducted criminal investigation. We then examine three unique data sets using Structural Equation Modelling (SEM) approach.

We find two principal findings from this study. First, law enforcement seems to have positive impact upon tax compliance. Second, the findings suggest that, while criminal investigation has played a vital role in determining the effectiveness of law enforcement, Audit Coverage Ratio (ACR) appears to be the most influential factor in improving tax compliance among other activities prescribed in the strategy map. The findings support the notion that law enforcement is an important aspect of tax administration and better law enforcement would help tax authorities in improving taxpayers' compliance. However, despite its novelty, our study was ambitious in its scope, and was ultimately limited in its findings by its reliance on the tax offices' KPIs data. Further and more detailed research is required to better understand these complex relationships.

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1. INTRODUCTION

No matter how good a tax policy is, it will not be useful if it is not implemented effectively (Bird 2008). Therefore, tax policy formulation must consider the administrative dimension of the tax system (Bird 2004). This is important to understand as tax policy and tax administration interact at three different levels: (i) policy formation and legislation; (ii) the administrative and institutional procedures required to implement these laws and regulations; and (iii) the actual implementation of the tax system (Bird 2004).

Furthermore, to ensure a fair and economically efficient tax system, tax authorities must operate effectively and efficiently (Klun 2004). Gill (2003) posits that although tax policies and laws are able to create the potential for increased tax revenue, the actual amount of tax revenue that can be actually collected is largely dependent on the effectiveness and efficiency of the tax administration.

The primary concern is that managing tax administration is challenging (Bird 2003). Good tax administration is not only highly dependent on the internal capabilities of the organization, the actions (and reactions) of individuals and the public, but also with the complex interactions between various environmental factors (OECD 2014; Rosid et al. 2016; Umar and Tusubira 2017) —OECD (2004) calls it 'operating context'. This is perhaps what makes Silvani and Baer (1997) posit that the first step policy makers need to take in conducting tax administration reform is to diagnose its existing problems and develop appropriate strategies for improvement. Without appropriate strategy, tax authorities are at high risk of underperforming (Gill 2000, 2003; Mc Kerchar and Evans 2009).

In this sense, in managing its performance, Indonesian tax authority—Directorate General of Taxation (DGT)—has implemented a strategic planning framework and strategy execution using Balanced Score Card (BSC) approach since 2010.¹ It is a strategy map that visually describe a high-level strategy, through several Strategic Objectives (SO) that are integrated in a structural causal relationship. In BSC, SOs are grouped into four perspectives: (i) stakeholders, (ii) customers, (iii) internal processes, and (iv) learning and growth.²

In this context, the stakeholder perspective has an objective of 'optimal state tax revenue', which generated from 'high level of taxpayer compliance' in the customers perspective. The strategic objective in the customers perspective is influenced by how well SOs in internal process perspective perform. Consecutively, the performance of several SOs in internal process perspective depends on the performance of several SOs in learning and growth perspective.

¹ See, Minister of Finance Decree No. 12/KMK.01/2010 regarding Performance Management.

² BSC was developed by Robert S. Kaplan and David P. Norton in 1992. In 1996, their book entitled *The Balanced Scorecards* was published. BSC is a tool for executing and monitoring organizational strategy using financial and non-financial measures. See, <https://balancedscorecard.org/bsc-basics-overview/>, accessed 15 November 2020.

Furthermore, SOs in the perspective of internal processes is divided into three major groups: (i) services and public relations, (ii) monitoring and supervision, and (iii) law enforcement. In this regard, Baurer (2005) states that modern tax administration generally carries out relatively the same types of activities or business processes. Unfortunately, at least empirically, there is no consensus on the causal relationship between business process performance and increased tax compliance. Studies related to the performance of tax administration business processes tend to focus only on the aspect of performance measurement rather than the performance management itself (see for example, Klun 2004; Serra 2005; von Soest 2006; Tennant and Tennant 2007).

In general, there are three primary processes that are undertaken by tax authorities: service and public relation, monitoring and supervision, and law enforcement (OECD 2014). With regard to law enforcement, traditionally, the relationship between law enforcement and tax compliance has often emphasized the probability effect of audits, the probability of detection and the magnitude of sanctions (see for example, Allingham and Sandmo 1972; Sandmo 2005; Cowell 1985; Franzoni 1998; Beck and Jung 1989; Dubin et al. al. 1990; Kirchler et al. 2010; Kirchler et al. 2014). In fact, the dynamics of audit implementation in developing countries do not necessarily follow the working assumptions prescribed in advanced countries (Congdon et al. 2009; Umar 2017). Nevertheless, despite the emergence of a new wave of socio-psychological variables after the conventional model of Allingham and Sandmo (1972), tax audit still play a key role in dealing with large-scale tax non-compliance in developing countries (Umar 2017).

This gap has led many studies related to tax compliance to depart from the solely original concept of 'economic deterrence models' (see for example, Brink and Porcano 2016; Cummings et al. 2009; Frey and Torgler 2007; Halla 2012; Kornhauser 2007; MacGregor and Wilkinson 2012; McKerchar et al. 2013; Yucedogru and Hasseldine 2016). This suggests the challenge of increasing tax revenue in developing countries cannot be overcome by tax administration alone, and understanding the effectiveness of law enforcement is critical (Umar and Tusubira 2017). Thus, given that to date there is no single 'magical medicine' or fiscal 'silver bullet' suitable for use in overcoming the complicated phenomenon of tax compliance (Bird 2013), understanding how effective law enforcement in increasing tax compliance is an important avenue for tax research (Walsh 2012).

The question is to what extent law enforcement activities are capable of increasing tax compliance? In response to this, we empirically investigate in more depth these strategic issues from the lens of the DGT's strategic map. Using administrative data, we contribute to the extant literature by providing a detailed analysis of the effectiveness of law enforcement in increasing tax compliance, particularly from an emerging economy perspective.

2. LITERATURE AND CONCEPTUAL FRAMEWORK

2.1 Law enforcement and tax compliance

The conceptual model of tax compliance is necessary to initially understand the importance of law enforcement in improving tax compliance. According to OECD (2013), one tax compliance model that is currently widely used by tax authorities in various parts of the world is the cooperative compliance model (CCM). Viewed from the perspective of the tax authority, compliance strategies vary from full-service oriented at the bottom to full legal prosecution at the top of the pyramid of the model. In other words, if the taxpayer wishes to comply, the authority needs to respond in ways and means to facilitate compliance.

Conversely, if taxpayers are known or suspected of tax evasion or deliberately evading taxes, they may face full enforcement. Law enforcement aspects in the CCM concept are two compliance strategies that exist at the top of the pyramid: (i) use the full force of the law and (ii) deter by detection. Both activities are undertaken in the forms of 'audit, investigation and other verification' and 'debt collection' (OECD 2017). The ability of tax authorities to provide optimal services for taxpayers who want to comply and prevent or detect non-compliance of taxpayers can be called administrative effectiveness (Langham et al. 2012). According to Lewis (1982) and Cullis and Jones (1992), tax-enforcement structures can affect perceived enforcement and opportunity for tax evasion.

In Indonesian context, the effectiveness of law enforcement needs increasingly urgent attention at least for two main reasons. First, its tax-to-GDP ratio is relatively low compared to other developing countries (Araki and Claus 2014), and to increase it has been proven to be difficult (OECD 2018). According to the OECD (2018), Indonesia's average tax ratio is still below 12% and this figure according to the IMF (2011) is lower than the average tax ratio in poor countries (low-income countries). Previously, according to Bird and Zolt (2005), the proportion of individual income tax revenue to Gross Domestic Product (GDP) in Indonesia is the lowest among neighbouring countries—at 1.3%, compared to Thailand, 1.9%; Philippines, 2.1%; and Malaysia, 2.7%. In other words, Indonesia's tax ratio is still very low by international standards and has even tended to decline over the past five years.³ Poor law enforcement appears to contribute to low tax ratios (OECD 2015) and one of the efforts to improve it is by strengthening the tax administration (OECD 2018).

Second, although the self-assessment system has been implemented for almost 35 years, the issue of tax compliance is still a major unresolved problem in Indonesia

³ It should be noted that tax ratios can be defined and calculated in several ways. In Indonesian context, the calculation of the tax ratio that is commonly used is in a narrow sense, that is, it does not include elements of local taxes and social security contributions. A more detailed discussion of the various methods of calculating the tax ratio can be seen in the OECD (2001).

(Ikhsan et al. 2005; Francis 2012; Basri et al. 2019). As a result, although DGT has made substantial changes through the tax administration reform program since 2002, the tax revenues that have been collected are still relatively low (Arnold 2012). Issues related to tax compliance are indeed not easy issues to resolve (Mikesell and Birskyte 2007). Referring to the 2015-2019 DGT Strategic Plan, the main concerns currently faced by the DGT in relation to its low tax ratios are low taxpayer compliance and ineffective supervision and law enforcement.⁴

Because it can be defined from various perspectives, tax compliance has various meanings. Its definition tends to be very broad and includes various aspects. Thus, to date there is no great consensus on what is meant by tax compliance (Devos 2014; McKerchar 2003; Weber et al. 2014). However, based on its approach, it is possible to categorize it two spheres: (i) conceptual approach (see, for example, James and Alley 2004; Kirchler 2007; and Weber et al. 2014) and (ii) operational approaches (see, for instance, Jackson and Milliron 1986; Alm 1991; Alm and Mckee 2006; IRS 2009), and OECD (2014)). While the conceptual approach tends to emphasize the willingness of taxpayers to comply with tax provisions when law enforcement activities are absent, the operational approach tends to focus more on certain aspects of fulfilling administrative aspect of tax liabilities.

Given its practical use, the operational approach seems to offer more advantages. Under this approach, the level of taxpayer compliance can be easily measured by only evaluating whether certain operational technical aspects of the tax requirements have been met. Somewhat similar to the OECD (2014) definition, tax compliance in Indonesia generally falls into two categories: 'formal compliance', mainly referring to the filing of tax returns, and 'material compliance', which broadly refers to the correct reporting and payment aspect.⁵

It is worth noting however that both compliance and non-compliance can be intentional or unintentional (Cooper 1994; Erard 1997; Lederman 2003; OECD 2014). In other words, differences in the level of taxpayer intentions and the effectiveness of the administration of tax authorities can lead to four types of compliance behavior: (i) deliberately compliant; (ii) accidentally non-compliant; (iii) accidentally compliant; and (iv) non-compliant or evasive (Langham et al. 2012; OECD 2014).

Referring to the ex-post definition of tax compliance, indeed, to find out what the typology of most taxpayers and how far the extent of their (non)compliance is hard. However, there are several indicators that can be used to indicate this. From a practical perspective, based on the criteria adopted in the DGT's strategy map, formal compliance measures the comparison between the number of taxpayers who lodge their tax return with the number of taxpayers who obliged to do so. Material compliance is defined as the ratio between the number of taxpayers who

⁴ See, Director General of Taxation Decree Number KEP-95/PJ/2015 regarding the DGT Strategic Plan for 2015 - 2019, pp. 10 - 11

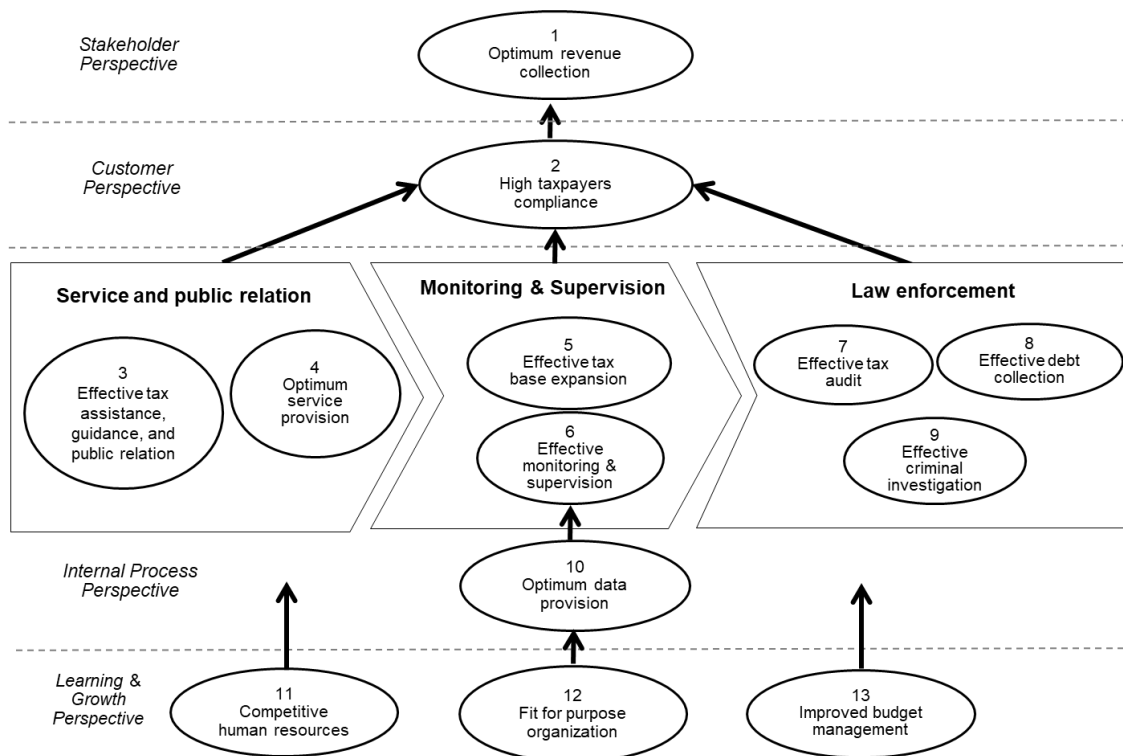
⁵ According to OECD (2014, p. 60) tax compliance has four pillars: "(i) to register for tax purposes; (ii) to file tax returns on time; (iii) to correctly report tax liabilities; and (iv) to pay taxes on time."

made payments and the number of taxpayers who are obliged to submit tax returns.

2.2 Tax administration strategy map

Strategy is an integrated set of choices of an organization, aiming at obtaining the expected results in the long run (Rivkin 2004). As explained earlier, DGT adopts BSC approach as a strategic management tool that translates the vision, mission, goals, and strategies. DGT’s strategy map is a visual description of the strategy, through several Strategic Goals (SG), linked conceptually in causal relationships. SGs are statements about what the organization should have, implement, produce, or achieve. The DGT strategy map has four perspectives: (i) stakeholders, (ii) customers, (iii) internal processes, and (iv) learning and growth. A visual description of the strategy adopted by DGT in 2018 for tax office is illustrated in Figure 1.

Figure 1: DGT’s strategy map



The conceptual framework of this study is the conception of structural causal relationships among the SGs deployed in the four perspectives of the strategy map.⁶ The performance of SG is measured by the realized scores of its corresponding Key Performance Indicators (KPIs) (Marr 2008). These values can be used as empirical referents in measuring effectiveness. According to OECD (2008), effectiveness is a measure to see how far ‘results’ or ‘impacts’ can be

⁶ To date, the design of strategy map and performance management in the DGT is referring to the Minister of Finance Decree Number 467/KMK.01/2014 concerning Performance Management.

achieved. Law enforcement policy can be considered effective if the impact (outcome) generated is in accordance with the desired outcome—i.e. improved compliance. That is, the extent to which compliance level could be increased is an indication of the effectiveness of a program.

Utilising KPIs realized values as parameters, we examine whether the program or activities attributed to law enforcement in the strategy map can improve taxpayer compliance. As depicted in Figure 1, 'optimal tax revenue collection' is a strategic goal within stakeholder perspective, which resulted from strategic goal of 'high taxpayer compliance' in the customer's perspective. Conceptually, strategic goals in the customer perspective is influenced by how well strategic objectives in the internal process perspective perform. Consecutively, the performance of strategic goals in internal process perspective depends on the performance of strategic goals in the learning and growth perspective. It is worth noting that strategic goals in internal process perspective is divided into three major groups: (i) services and public relations, (ii) supervision, and (iii) law enforcement. A detailed explanation of the strategic goals prescribed in the DGT strategy map can be found in Appendix 1.

2.3 Program logic of tax compliance

OECD (2008) offers a relevant definition of what effective means. Effectiveness is a measure to evaluate the extent to which 'results' or 'impacts' has been achieved. In improving tax compliance, tax authority requires resources (inputs) (such as human resources and budgets). These resources are used to carry out various activities, such as education to taxpayers, administrative services, auditing, billing, and other administrative activities. Activities executed produce outputs. This output can be in the form of number of services performed or number of audits completed. This output is then expected to have an impact (outcome). In general, the overall impact that the tax authorities want to achieve in relation to their operation is improved taxpayer compliance. In this sense, effectiveness occurs when the impact of the activity or program is as expected.

For this reason, we consider law enforcement is effective if the actual impact is in accordance with the desired outcome—i.e. it increased taxpayer compliance. Thus, the extent to which compliance behaviour can be improved is an indication of the effectiveness of a program. Referring to the previous explanation, using the KPI performance value as a parameter, we explore whether the existing activities in the aspect of law enforcement in the strategy map can increase taxpayer compliance, as conceptually expected in the strategic goals.

2.4 Research problem and propositions

The performance of tax authorities can be broadly measured at three levels: strategic, operational, and individual (Crandall 2010). We seek to strategically examine whether law enforcement is effective in improving tax compliance in Indonesia. To elaborate upon this research endeavour, based on the theoretical framework and extant literature, we consider the following research propositions.

To clearly comprehend the scope of the study, we present the research propositions as a set of alternative and null (H_o) hypotheses in Table 1 as follows.

Table 1: Hypotheses under study

No	Prediction	
1	H _{1a}	Audit coverage ratio positively improve the level of formal compliance
	H _{1o}	Audit coverage ratio do not improve the level of formal compliance
2	H _{2a}	Non-disputed tax assessments positively improve the level of formal compliance
	H _{2o}	Non-disputed tax assessments do not improve the level of formal compliance
3	H _{3a}	Imprisonment proposal for unpaid tax arrears positively improve the level of formal compliance
	H _{3o}	Imprisonment proposal for unpaid tax arrears imprisonment do not improve the level of formal compliance
4	H _{4a}	Information reporting upon indication of tax crime positively improve the level of formal compliance
	H _{4o}	Information reporting upon indication of tax crime do not improve the level of formal compliance
5	H _{5a}	Audit coverage ratio positively improve the level of material compliance
	H _{5o}	Audit coverage ratio do not improve the level of material compliance
6	H _{6a}	Non-disputed tax assessments positively improve the level of material compliance
	H _{6o}	Non-disputed tax assessments do not improve the level of material compliance
7	H _{7a}	Imprisonment proposal for unpaid tax arrears positively improve the level of material compliance
	H _{7o}	Imprisonment proposal for unpaid tax arrears do not improve the level of material compliance
8	H _{8a}	Information reporting upon indication of tax crime positively improve the level of material compliance
	H _{8o}	Information reporting upon indication of tax crime do not improve the level of material compliance

3. DATA AND METHODOLOGY

3.1 Data

The main objective of this study is to better understand the effectiveness of law enforcement in improving tax compliance in Indonesia. In doing this, we employ a census approach for data collection. Thus, we collect and analyse quantitative data (i.e. the scores of KPIs) from all tax offices across Indonesia. The number and the distribution of tax offices are described in Table 2. As described in the table, there are 352 tax offices across Indonesia. Apparently, the number of tax offices vary for each main islands. Java has the largest number of tax offices (57% or 202

out of 352 tax offices) mainly because 58% of Indonesia's GDP is generated from this region (BPS 2013). In terms of type, vast majority of tax offices is categorised as small tax offices (91% or 319 out of 352 tax offices)

Table 2: Number of tax offices under study

No	Regions	Type of tax offices				Total
		Large	Special	Medium	Small	
1	Jawa	4	9	13	176	202
2	Sumatra	-	-	4	67	71
3	Sulawesi	-	-	1	25	26
4	Kalimantan	-	-	1	26	27
5	Bali, Nusra, Papua, & Maluku	-	-	1	25	26
	Total	4	9	20	319	352

In addition, we are also capable of obtaining a confidential list of 480 taxpayers that have been investigated in relation to indication of committing tax crime. Based on Preliminary Criminal Investigation Reports for fiscal year 2018, we are aware that it generally took 1,5 years to 2 years to conclude the investigation. Using this list, we then generate two additional data sets. The first data set consists of 185 tax offices where these 480 criminally investigated taxpayers were administered, while the second data set is the rest (i.e. 167 tax offices without taxpayers being criminally investigated). To simplify, we named the former 'data set 1' and the latter 'data set 2'.

3.2 Methodology

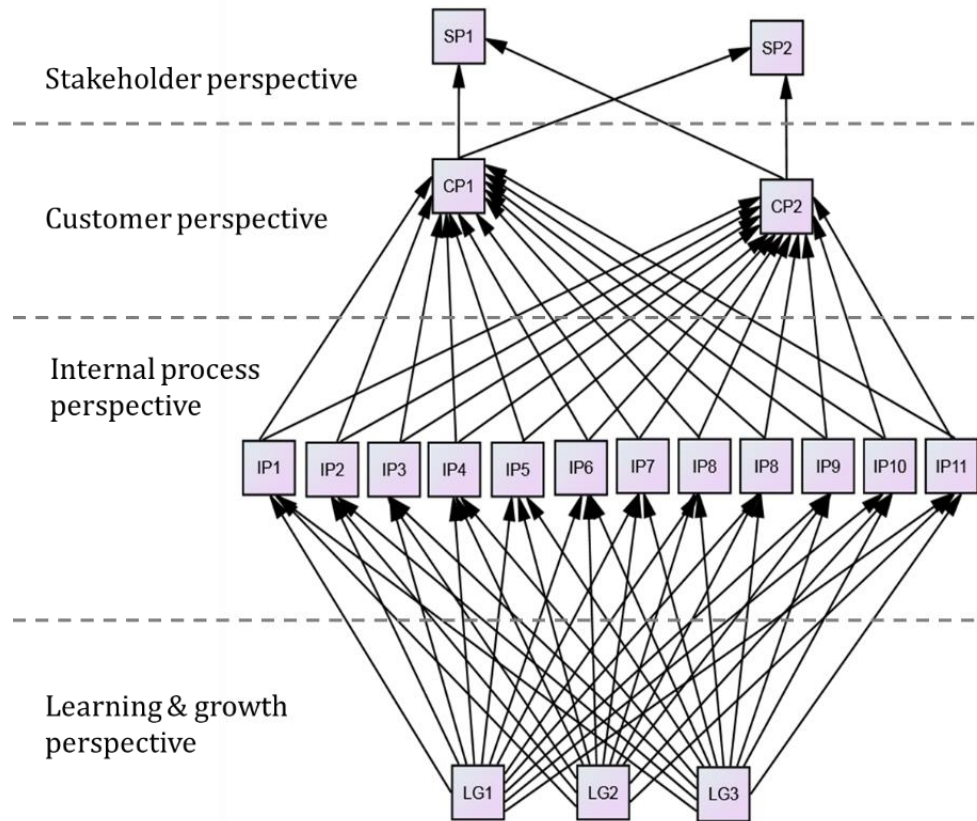
We use the conceptual model of DGT's strategy map to test the effectiveness of law enforcement in improving tax compliance. To empirically examine the effectiveness of law enforcement in increasing tax compliance, we adopt a 'conceptual testing' approach to evaluate whether law enforcement activities affect tax compliance. The conceptual framework being tested here is a strategy map.

In this regard, we consider Structural Equation Modeling (SEM)—defined as a statistical technique for determining, estimating, and evaluating the linear relationship model among a set of observed variables (Shah and Goldstein 2006)—is an appropriate approach to adopt. The reason is that SEM is a tool for 'confirmatory' rather than a tool for 'exploratory' (Gefen et al. 2000; Kline 2005, 2011). As an a priori technique for determining the pattern of linear relationships between a set of variables simultaneously, rather than for 'finding' an appropriate model (Shah and Goldstein 2006), SEM is considered as an appropriate statistical tool and powerful for testing theories or concepts (Steenkamp and Baumgartner 2000 ; Hair et al. 2010; Blunch 2013).

SEM method emphasizes the importance of understanding the pattern of correlations between a set of variables and describing as much of their variance as possible with the model being tested (Kline 2005, 2011). The conceptual framework

of path analysis in which SEM is applied to test simultaneously all causal relationships among observed variables in the strategy map is shown in Figure 2.

Figure 2: The Conceptual Framework Examined Using SEM



Note: The rectangles indicate the observed variables under study (i.e. KPIs; 19 in total). *SP* represents KPI from stakeholder perspective (i.e. two KPIs), *CP* represents KPI from customer perspective (i.e. two KPIs), *IP* represents KPI from internal process perspective (i.e. 12 KPIs), *LG* represents KPI from learning & growth perspective (i.e. three KPIs). In this conceptual model, 64 causal relationships were analysed simultaneously.

In this study, we treat KPIs scores as empirical referents. There are 19 KPIs data in the DGT 2018's strategy map. It serves as quantitative indicators for how well strategic goals have been achieved. By way of illustration, the empirical referent for the Audit Coverage Ratio (ACR) is the KPI score for the ACR, while the empirical reference for level of tax compliance is the score of KPI for the tax compliance. By doing this, the variables that were previously in a theoretical level can be operationalized into an empirical level for statistical analysis. It is worth noting that the scale of all empirical referents in this study are ratio (i.e. percentage). We provide detailed information relating to these KPIs, including their codes, aims, and formulas in Appendix 2.

4. RESULTS

4.1 Descriptive statistics

We report the descriptive statistics (mean, standard deviation, minimum, and maximum) of 19 KPIs scores from 352 tax offices across Indonesia for 2018 in Table 3. As we can see in the table, the realized scores for KPIs vary, with the mean for *routine tax revenue* was the lowest (87%) and the mean for *data feeding for tax potential* was the highest (451%).

Table 3: KPIs scores for 2018, N = 352 tax offices

Perspec.		KPI's name	Min.	Max.	Mean	SD
Stake holders	1	Realized amount of regular remittance (%)	0	171.0	86.8	13.4
	2	Realized amount of extra effort remittance (%)	30.1	247.6	108.6	32.5
Customer	3	Filing ratio of annual income tax returns by corporate and self-employed taxpayers (%)	49.7	229.4	106.5	25.8
	4	Proportion of corporate and self-employed taxpayers made tax payments (%)	41.3	286.2	106.5	29.7
Internal business process	5	Effectiveness of tax socialization (%)	87.7	510.0	155.9	50.2
	6	Proportion of tax returns lodged via e-filing (%)	75.6	145.1	105.4	10.7
	7	Realized on-time excellent service delivery (%)	86.6	128.4	100.0	1.9
	8	Share of newly registered taxpayers making payments (%)	38.1	315.6	119.2	27.6
	9	Share of successful tax inquiries (%)	13.0	390.0	112.6	44.5
	10	Approved random audit proposals (%)	0	637.5	161.3	99.7
	11	Audit coverage ratio (%)	54.8	294.9	143.8	41.3
	12	Proportion of non-disputed tax assessment (%)	90.2	118.1	112.5	3.6
	13	Completed imprisonment proposal for unpaid tax arrears (%)	0	600.0	143.3	76.5
	14	Realized information reporting upon indication of tax crime (%)	0	766.7	129.9	69.3
	15	Data feeding for tax potential (%)	12.5	6,245.0	451.0	656.8
Learning & growth	16	On-time data archiving and documentation (%)	19.8	110.6	102.1	9.5
	17	Share of employees met standard training hours (%)	95.6	142.9	128.3	11.5
	18	Realized organizational performance dialogue and action plan monitoring (%)	94.1	142.9	116.6	3.3

19	Budget execution quality (%)	78.6	118.8	102.6	5.2
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Note: In total, there are 12 KPIs in the internal process perspective. Three KPIs are representing *service and public relation* activities (i.e. no 5, 6, and 7), three KPIs are representing *monitoring and supervision* activities (i.e. no 8, 9, and 10), and four KPIs belongs to *law enforcement* activities (i.e. no 11, 12, 13, and 14). Two other KPIs are supporting activities.

4.2 Inferential statistics

4.2.1 Structural Equation Modeling

As depicted in the conceptual model (Figure 2), in total there are 64 causal relationships that were tested simultaneously using SEM. The details of these relationships are as follows: 36 causal relationships resulted from 3 KPIs in the *learning & growth* perspective and 12 KPIs in the *internal process* perspective, 24 relationships resulted KPIs in the *internal process* perspective and 2 KPIs in the *customer* perspective, and 4 relationships generated from KPIs in the *customer* perspective and 2 KPIs in the *stakeholder* perspective.

Based on these SEM outputs, we then classify these causal relationships based on the direction of the relationship and the level of its statistical significance. We mainly use confidence level of 95 percent in this analysis (i.e. $\rho \leq 0.05$). As such, there are four categories of the nature of relationships: (i) positive—significant; (ii) positive—insignificant; (iii) negative—significant; and (iv) negative—insignificant.⁷

At strategy map level, we find that majority (63%) of causal relationships were positive (i.e. 43 out of 64). We report the statistical outputs in Appendix 3 and summarise these results in Table 4.

Table 4: Variation in Causal Relationships in Strategy Map, National (N = 352 KPP)

Statistical status	Nature of relationship		Total
	Positive	Negative	
Significant ($\rho \leq 0.05$)	12 (19%)	1 (2%)	13 (20%)
Non-significant	28 (44%)	23 (36%)	51 (80%)
	40 (63%)	24 (38%)	64 (100%)

Regarding internal process, as shown in Table 5, all KPIs for *service and public relation* activities appears to have positive relationship with tax compliance KPIs and 67% of them have a statistically significant relationship. Meanwhile, the KPIs for *monitoring and supervision* activities has a balanced portion of positive and negative relationships (50% each) with tax compliance KPIs, with only one

⁷ A positive causal relationship between, for instance, $A \rightarrow B$ is considered to occur if an increase in the value of variable A is followed by an increase in the value of variable B, *vice versa*. Conversely, a negative causal relationship between, for instance, $C \rightarrow D$ is considered to occur if an increase in the value of variable C is followed by a decrease in the value of variable B, *vice versa*.

statistically significant positive relationship (17%). Further, 75% of causal relationships between law enforcement and tax compliance appears to have positive relationships with 38% of the total are statistically significant.

Table 5: Causal relationships between DGT's internal process and tax compliance

Category of internal process	Statistical status	Nature of relationship		
		Positive	Negative	Total
Service and public relation	Significant ($\rho \leq 0.05$)	4 (67%)	0 (0%)	4 (67%)
	Non-significant	2 (33%)	0 (0%)	2 (33%)
	Total	6 (100%)	0 (0%)	6 (100%)
Monitoring and supervision	Significant ($\rho \leq 0.05$)	1 (17%)	0 (0%)	1 (17%)
	Non-significant	2 (33%)	3 (50%)	5 (83%)
	Total	3 (50%)	3 (50%)	6 (100%)
Law enforcement	Significant ($\rho \leq 0.05$)	3 (38%)	1 (13%)	4 (50%)
	Non-significant	3 (38%)	1 (13%)	4 (50%)
	Total	6 (75%)	2 (25%)	8 (100%)

4.2.2 Hypotheses testing

To address the research problem, we examine eight hypotheses previously described in Section 2.4 at an α level of 0.05. The findings are as follows:

H₁: audit coverage ratios improve formal compliance

We find a statistically significant positive relationship between audit coverage ratio and formal compliance ($\rho = 0.01$), with standardised coefficient value of 0.13. This finding shows that the level of audit coverage was influential in improving the level of formal compliance. Based on this result, the null hypothesis H_{1o} can be rejected.

H₂: non-disputed tax assessments improve formal compliance

We find a statistically significant positive relationship between non-disputed tax assessment and formal compliance ($\rho=0.04$), with standardised coefficient value of 0.10. It suggests that tax audit process was an important part in improving the level of formal compliance. Based on this result, the null hypothesis H_{2o} can be rejected.

H₃: proposal for tax arrears imprisonment do not improve formal compliance

We discover no statistically significant relationship between proposal for tax arrears imprisonment and formal compliance ($\rho=0.75$), with standardised coefficient value of -0.02. The finding indicates that increasing the proposal for tax arrears imprisonment has no effect upon the level of formal compliance. Based on this result, the null hypothesis H_{3o} can be accepted.

H4: information reporting upon indication of tax crime improve formal compliance

We find a statistically significant positive relationship between information reporting upon indication of tax crime and formal compliance ($\rho=0.10$), with standardised coefficient value of 0.08. This means that, although seems miniscule, information reporting upon indication of tax crime has increased the level of formal compliance. Based on this result, the null hypothesis H_{4_0} can be rejected.

H5: audit coverage ratios improve material compliance

We detect a statistically significant positive relationship between audit coverage ratio and material compliance ($\rho = 0.003$), with standardised coefficient value of 0.15. This finding shows that the level of audit coverage was influential in improving the level of material compliance. Based on this result, the null hypothesis H_{1_0} can be rejected.

H6: non-disputed tax assessments decrease material compliance

We observe a statistically significant negative causal relationship between non-disputed tax assessment and material compliance ($\rho=0.02$), with standardised coefficient value of -0.12. It suggests that tax audit process was an important part of taxpayers' material compliance. Based on this result, the null hypothesis H_{2_0} can be rejected.

H7: proposal for tax arrears imprisonment do not improve material compliance

We find no statistically significant relationship between proposal for tax arrears imprisonment and material compliance ($\rho=0.55$), with standardised coefficient value of 0.03. It demonstrates that increasing the proposal for tax arrears imprisonment has no effect upon the level of material compliance. Based on this result, the null hypothesis H_{3_0} can be accepted.

H8: information reporting upon indication of tax crime do not improve material compliance

We discover no statistically significant relationship between information reporting upon indication of tax crime and material compliance ($\rho=0.68$), with standardised coefficient value of 0.02. It demonstrates that increasing the information reporting upon indication of tax crime has no effect upon the level of material compliance. Based on this result, the null hypothesis H_{3_0} can be accepted.

For easier comprehension, we summarise the results for H_1 - H_8 and present it in Table 6.

Table 6: Summary of standardised direct effects between law enforcement activities and the level of tax compliance arising from hypotheses H1-H8

No	Types of law enforcement activities (N=352 tax offices)	Types of compliance	
		Formal	Material
1	Audit coverage ratio	0.13***	0.15***
2	Non-disputed tax assessment	0.10**	-0.12**
3	Proposal for imprisonment of tax arrears	-0.02	0.03
4	Information reporting upon indication of tax crime	0.08*	0.02

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$

4.2.3 Robustness tests – Preliminary criminal investigation approach

As indicated earlier section 3.1, we employ two additional data sets. The first data set consists of 185 tax offices where 480 criminally investigated taxpayers were administered, while the second data set is the rest (i.e. 167 tax offices not having taxpayers being criminally prosecuted). Likewise, we utilise SEM approach to examine each of these data sets. We report the statistical results in Appendix 4 for the former, and in Appendix 5 for the latter. Then we summarise and present these findings in Table 7.

Table 7: Comparison of standardised direct effects between law enforcement activities and the level of tax compliance

	Types of law enforcement activities	Data set 1: Group of tax offices having taxpayers being criminally investigated (N=185)		Data set 2: Group of tax offices not having taxpayers being criminally investigated (N=167)	
		Types of compliance		Types of compliance	
		Formal	Material	Formal	Material
1	Audit coverage ratio	0.206***	0.189***	0.075	0.086
2	Non-disputed tax assessment	0.128	-0.170**	0.094	-0.032
3	Proposal for imprisonment of tax arrears	-0.025	0.063	0.041	0.022
4	Information reporting upon indication of tax crime	0.061	0.021	0.066	0.007

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$

Based on these results, we discover statistically significant positive relationships have emerged between audit coverage ratio and both formal and normal

compliance only for the data set 1. Surprisingly, we find no statistically significant relationships for data set 2. Thus, it indicates that the level of audit coverage was influential in improving the level of both formal and material compliance only for tax offices that administering criminally investigated taxpayers, as indicated not only by its statistical significance but also by the value of the standardised coefficients.

5. DISCUSSIONS

Utilising theory testing approach, we examine the causal relationships between observed variables under study as prescribed in the DGT's strategy map. In general, the nature of relationships between three internal business process and level of tax compliance appear to be as expected. For instance, within *service and public relation*, all causal relationships show positive values (100%), while for *law enforcement* activities 75% of relationships are positive. The lowest portion was *monitoring and supervision* which only has 50% of positive relationship.

Law enforcement activities in particular gives somewhat the expected effect. This can be seen not only from the major proportion of positive causality (i.e. 75%) but also half of these positive relationships were statistically significant. At national level (i.e. 352 tax offices), the results show that audit coverage ratio (ACR) was influential in improving both types of tax compliance. It should be noted that, in relation to ACR, DGT appears to focus on corporate taxpayers rather than individual taxpayers. By way of illustration, based on the 2018 DGT Performance Report, the targeted ACR for corporate taxpayers in 2016, 2017, and 2018 were 1.68%, 2.32%, and 2.32% respectively; while for the individual taxpayers were only 0.23%, 0.39%, and 0.39%.

This finding supports the importance of traditional views of economic deterrent models which emphasized the probability effect of audits and the probability of detection (see for example, Allingham and Sandmo 1972; Sandmo 2005; Cowell 1985; Beck and Jung 1989; Dubin et al. 1990; Kirchler et al. 2014). While it is acknowledged that dissatisfaction with the traditional economic approach in understanding taxpayers' compliance behaviour motivates the development of research related to behavioural insights into tax compliance strategies (Reeson and Dunstall 2009; Alm 2011; OECD 2013; Ritsatos 2014), it is worth noting that non-deterrence approaches have not supplanted, but only complemented, the critical role of deterrence as an essential measure of ensuring tax compliance (Hofmann et al. 2008; Kirchler et al. 2008; Osofsky 2014).

The magnitude of ACR in influencing tax non-compliance behavior can be described traditionally in the following illustration. Assuming the taxable income is Y and the tax rate is t , then a person who reports taxes honestly will pay all taxes owed and enjoy an income of $(1-t) Y$. However, if the individual decides not to comply, then it can be assumed that there will be a possibility of his action being discovered by the tax authorities of p , and the penalty to be paid is F . The expected value (EV) of this action is: $E(v) = p(Y-F) + (1-p)Y$

If the value of this EV is greater than $(1-t)Y$, then based on this model, it is assumed that the individual will commit tax evasion. For example, if $Y = \text{IDR } 12 \text{ million}$, $p = 0.5$, $t = 0.33$ and $F = \text{IDR } 5 \text{ million}$, then the comparison is as follows: $(1-t)Y = 0.66 \times \text{IDR } 12 \text{ million} = \text{IDR } 8 \text{ million}$, compared to: $p(Y-F) + (1-p)Y = 0.5(\text{IDR } 12 \text{ million} - \text{IDR } 5 \text{ million}) + 0.5(\text{IDR } 12 \text{ million}) = \text{IDR } 9.5 \text{ million}$. If the p value in this example is changed to 0.25, the comparison value changes to Rp. 11 million. The assumption for a p -value of 0.5 or 0.25 is arguably unrealistic. That is, saying that the possibility of a taxpayer being audited by 50% or 25% in the real world is almost impossible. In fact, as described earlier, the probability of getting audited for individual taxpayers in Indonesia is less than 0.4%.

The purely traditional economic deterrence model is considered unrealistic because: (i) in reality the ACR value is relatively, if not extremely, small, (ii) the decision to undertake tax non-compliance is not influenced by economic rationality consideration (maximizing strategies) but also by something that is common (i.e. rules of thumb or heuristics) (Cullis and Jones 1992; Ritsatos 2014).

Regarding the latter, in support of the so-called 'spill-over effect' phenomenon (see for example, Alm 2011; Lederman 2010), the findings of this study demonstrate that actual law enforcement have a real effect in determining the effectiveness of tax authorities capabilities in improving tax compliance. One possible explanation for this finding is, from taxpayers' perspective, a cognitive bias that suggests taxpayers tend to rely more heavily on information that is readily accessible to evaluate the frequency or likelihood of getting audited or investigated—a phenomenon termed *availability bias* (Sunstein 2002).⁸

6. CONCLUSIONS AND POLICY IMPLICATIONS

6.1 Conclusions

This study seeks to measure the extent to which the effectiveness of law enforcement activities carried out by the Directorate General of Taxes (DGT) in increasing tax compliance. This effort requires measurement and assessment at the strategic level. On this ground, this study employs DGT's strategy map as its working perspective.

We choose the strategy map perspective because it is a visual description of the strategy, through several strategic goals that are integrated in structural causal relationships. It can be conceptually used as an underlying parameter to measure the effectiveness of law enforcement in improving tax compliance quantitatively. In this notion, an activity or program is effective if it has an impact as expected. The effectiveness of law enforcement activities is measured and empirically examined by looking at their impact on improving compliance levels. In assessing

⁸ That is, for instance, "the impact of seeing a house burning on the subjective probability of such accidents is probably greater than the impact of reading about a fire in the local paper" (Tversky & Kahneman 1974, p. 1127).

the effectiveness of law enforcement in improving tax compliance, this study analyses 19 KPIs from 352 tax offices across Indonesia for fiscal year 2018.

We find that the causal relationship of strategic goals in the DGT strategy map is dominated by positive values (63%) and law enforcement activities, particularly in the form of audit coverage ratio, appear to be effective in improving both formal and material compliance. In this context, the existence of criminal investigation seems to be a defining factor. That is, the level of audit coverage was influential in improving the level of both formal and material compliance in group of tax offices where criminal investigation took place. Further research is needed to better understand this complex relationship.

6.2 Policy implications

This study has succeeded in offering a parameter that can be empirically examined to measure the effectiveness of law enforcement activities in Indonesia. The parameter in question is the prescribed causal relationships in the DGT strategy map. These causal relationships were expected to occur between the law enforcement business process and the level of taxpayer compliance. Accordingly, those with an interest in further examining the extent to which DGT's internal capabilities are effective in increasing tax compliance might use this approach. If this approach is adopted, to enrich and refine the empirical findings, we recommend that further analysis employs multi years of KPIs data.

7. REFERENCES

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8. APPENDIX

Appendix 1: Strategic Goals (SGs) and SGs' description in the DGT 2018's Strategy Map

No.	Perspective	Strategic Goals (SG)	SG description
1	<i>Stakeholders</i>	Optimum revenue collection	Optimization of revenue mobilization for state budget targets.
2	<i>Customer</i>	High taxpayer compliance	Improving taxpayers' compliance in registration, filing, reporting, and payments.
3	<i>Internal Process</i>	Effective socialization and dissemination	Increased socialization and dissemination on taxpayers' rights and obligations as well as tax-related information to foster compliance.
4	<i>Internal Process</i>	Optimum tax services	Providing services in accordance with prescribed procedures that meet the need of taxpayers
5	<i>Internal Process</i>	Optimum tax base expansion	Increasing the effectiveness of tax base expansion by increasing the number of registered taxpayers by increasing the compliance of new taxpayers.
6	<i>Internal Process</i>	Effective taxpayer monitoring and supervision	Monitoring and supervision of tax obligations to improve taxpayer compliance.
7	<i>Internal Process</i>	Effective tax audit	Increasing the deterrent effect of tax audit activities to increase taxpayer compliance.
8	<i>Internal Process</i>	Effective debt recovery	Increasing the effectiveness of unpaid tax collection as well as increasing the deterrent effect of law enforcement activities on taxpayers to increase taxpayer compliance.
9	<i>Internal Process</i>	Effective criminal investigation	Effective investigation activities to generate a deterrent effect and increase taxpayer compliance.
10	<i>Internal Process</i>	Optimum data feeding	Optimization of tax data to produce accurate, complete, and consistent tax information to support tax intensification and extensification activities.
11	<i>Learning & Growth</i>	Competitive human resources (HR)	Ensuring tax officers to have and improve the competencies needed for organizational goals.
12	<i>Learning & Growth</i>	Purpose-fit organization	Facilitating the agility of organization to meet the needs and the dynamic of the Ministry of Finance's institutional transformation.
13	<i>Learning & Growth</i>	Budget management quality	Ensuring the budget is managed based of a predetermined plan efficiently and effectively.

Source: DGT internal document

Appendix 2: KPIs' Name, Code, Aims, and Formula for tax office (2018)

No	KPI's name	KPI's code	Aims	KPI's formula
1	Realized amount of regular remittance (%)	1a-CP	To monitor tax receipts from regular taxpayer payments	$(\text{realized regular tax remittance} / \text{regular tax remittance target}) \times 100\%$
2	Realized amount of extra effort remittance (%)	1b-CP	To monitor tax revenue generated from extra effort activities	$(\text{realized extra effort tax remittance} / \text{extra effort tax remittance target}) \times 100\%$
3	Filing ratio of annual income tax returns by corporate and self-employed taxpayers (%)	2a-CP	To improve taxpayer (formal) compliance based on the number of received tax returns	$(\text{total number of annual tax returns submitted by corporate and self-employed taxpayers} / \text{the number of registered corporate and self-employed taxpayers}) \times 100\%$
4	Proportion of corporate and self-employed taxpayers made tax payments (%)	2b-CP	To improve taxpayer (material) compliance based on the number of active taxpayer bases.	$(60\% \times \text{number of corporate and self-employed taxpayers made payments} / \text{number of corporate and self-employed taxpayers obliged to submit annual tax returns}) + (40\% \times \text{number of corporate and self-employed taxpayers made prescribed amount of payments} / \text{number of corporate and self-employed taxpayers obliged to submit annual tax returns})$
5	Effectiveness of tax socialization (%)	3a-CP	To increase the awareness of taxpayers and assisting taxpayer in fulfilling their tax obligation.	$(\text{ratio of outreach activities} \times 100\%) \times 50\% + (\text{ratio of behaviour change} \times 50\%)$
6	Proportion of tax returns lodged via e-filing (%)	4a-CP	To improve the accuracy of taxpayer data and making it easier for taxpayers in submitting annual tax returns	$(\text{realized number of e-filing submission} / \text{e-filing target}) \times 100\%$
7	Realized on-time excellent service delivery (%)	4b-N	To improve the performance of prioritised services to taxpayers	$(\text{number of prioritised services completed on-time} / \text{number of prioritised services requests}) \times 100\%$

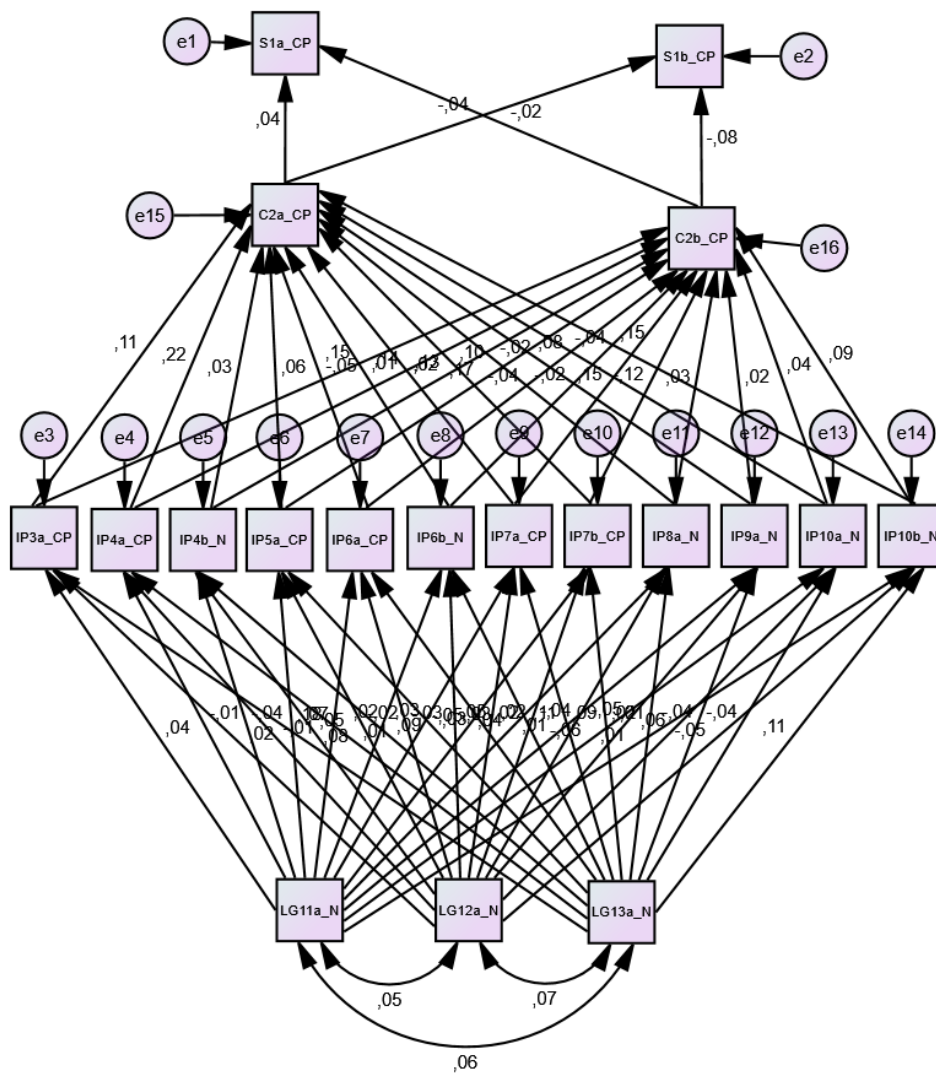
8	Share of newly registered taxpayers making payments (%)	5a-CP	To optimize revenue collection from newly registered taxpayers	$\frac{\text{Realization of New WPs who make payments} / \text{New Target WPs who make payments}}{100\%}$
9	Share of successful tax inquiries (%)	6a-CP	To increase the quality of data matching process upon tax returns to optimize revenue collection	$(\text{Percentage of data inquiries for annual tax returns} \times 50\%) + (\text{Percentage of data inquiries for monthly tax returns} \times 50\%)$
10	Approved random audit proposals (%)	6b-N	To increasing the number of targeted taxpayers for random audits	$(\text{approved proposal for random audits} / \text{target for random audits proposals}) \times 100\%$
11	Audit coverage ratio (%)	7a-CP	To increase stakeholder trust and taxpayer compliance through increased coverage of tax audits	$((\frac{\sum \text{audited corporate taxpayers}}{\sum \text{corporate taxpayers obliged to submit annual tax returns}}) / x) \times 50\%) + ((\frac{\sum \text{audited self-employed taxpayers}}{\sum \text{self-employed taxpayers obliged to submit annual tax returns}}) / y) \times 50\%)^9$
12	Proportion of non-disputed tax assessment (%)	7b-CP	To improve the quality of tax audits in revenue collection through effective audit process	$(\text{number of agreed tax assessments, i.e. were not filed for objection by taxpayers} / \text{number of tax assessment issued}) \times 100\%$
13	Completed imprisonment proposal for unpaid tax arrears (%)	8a-N	To ensure the quality and the legal aspects of imprisonment proposal for unpaid tax arrears	$(\text{approved proposals for imprisonment} / \text{the number of received proposals for imprisonment}) \times 100\%$
14	Realized information reporting upon indication of tax crime (%)	9a-N	To increase tax offices' role in supporting law enforcement activities carried out by the regional tax offices	$(\text{realized indication of tax crime reported to regional tax office} / \text{target for information reporting upon indication of tax crime}) \times 100\%$

⁹ x= targeted ACR for corporate taxpayers; y = targeted ACR for self-employed taxpayers. Both figures are determined by Head Office of DGT.

15	Data feeding for tax potential	10a-N	To provide accurate and complete administrative data as well as cooperative collaboration among tax offices	<i>(Actual amount of data provided / amount of data planned to be provided) x 100%</i>
16	On-time data archiving and documentation	10b-N	To ensure tax returns data is well-documented for data integration and data warehouse.	<i>(number of annual tax returns documented on time / number of annual tax returns should be documented on time) x 100%</i>
17	Share of employees met standard training hours	11a-N	To improve the competencies and performance of employees through capacity building	<i>(Percentage of employees met face-to-face hourly learning standards x 70%) + (Percentage of employees met hourly e-learning standards x 30%)</i>
18	Realized organizational performance dialogue and action plan monitoring	12a-N	To improve the effectiveness of organization in managing performance and its identified risks.	<i>(realized scores for organizational performance dialogue and action plan monitoring / maximum scores for organizational performance dialogue and action plan monitoring) x 100%</i>
19	Budget execution quality	13a-N	To ensure budget management is well-implemented	<i>Scores based on budget absorption, level of efficiency, quality of output, and budget consistency</i>

Source: DGT internal data, compiled by the author

Appendix 3: Structural causal models for national level (N=352 tax offices)



Note: **1a-CP** = Realized amount of regular remittance (%); **1b-CP** = Realized amount of extra effort remittance (%); **2a-CP** = Filing ratio of annual income tax returns by corporate and self-employed taxpayers (%); **2b-CP** = Proportion of corporate and self-employed taxpayers made tax payments (%); **3a-CP** = Effectiveness of tax socialization (%); **4a-CP** = Proportion of tax returns lodged via e-filing (%); **4b-N** = Realized on-time excellent service delivery (%); **5a-CP** = Share of newly registered taxpayers making payments (%); **6a-CP** = Share of successful tax inquiries (%); **6b-N** = Approved random audit proposals (%); **7a-CP** = Audit coverage ratio (%); **7b-CP** = Proportion of non-disputed tax assessment (%); **8a-N** = Completed imprisonment proposal for unpaid tax arrears (%); **9a-N** = Realized information reporting upon indication of tax crime (%); **10a-N** = Data feeding for tax potential; **10b-N** = On-time data archiving and documentation; **11a-N** = Share of employees met standard training hours; **12a-N** = Realized organizational performance dialogue and action plan monitoring; **13a-N** = Budget execution quality

**Standardised total effects arising from structural causal models for national level
N=352 tax offices)**

Part 1 of 2

	LG13a_N	LG12a_N	LG11a_N	IP10b_N	IP5a_CP	IP7a_CP	IP7b_CP	IP8a_N	IP9a_N
IP10b_N	0,109**	-0,053	0,012	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,031	-0,021	0,180***	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,085	-0,048	0,032	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,022	0,022	-0,047	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	0,012	-0,040	0,036	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	-0,042	-0,050	0,007	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	-0,035	0,064	-0,062	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,115**	-0,025	0,015	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	-0,020	-0,025	0,067	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,095	0,050	-0,040	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	0,007	-0,013	-0,009	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	0,082	0,017	0,041	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	0,036	-0,014	0,041	0,087	0,166***	0,147***	-0,121**	0,030	0,021
C2a_CP	0,044	-0,018	0,013	0,148***	0,063	0,134**	0,104**	-0,016	0,083*
S1b_CP	-0,005	0,002	-0,004	-0,013	-0,016	-0,017	0,005	-0,002	-0,005
S1a_CP	0,001	0,000	-0,001	0,003	-0,002	0,001	0,007	-0,001	0,002

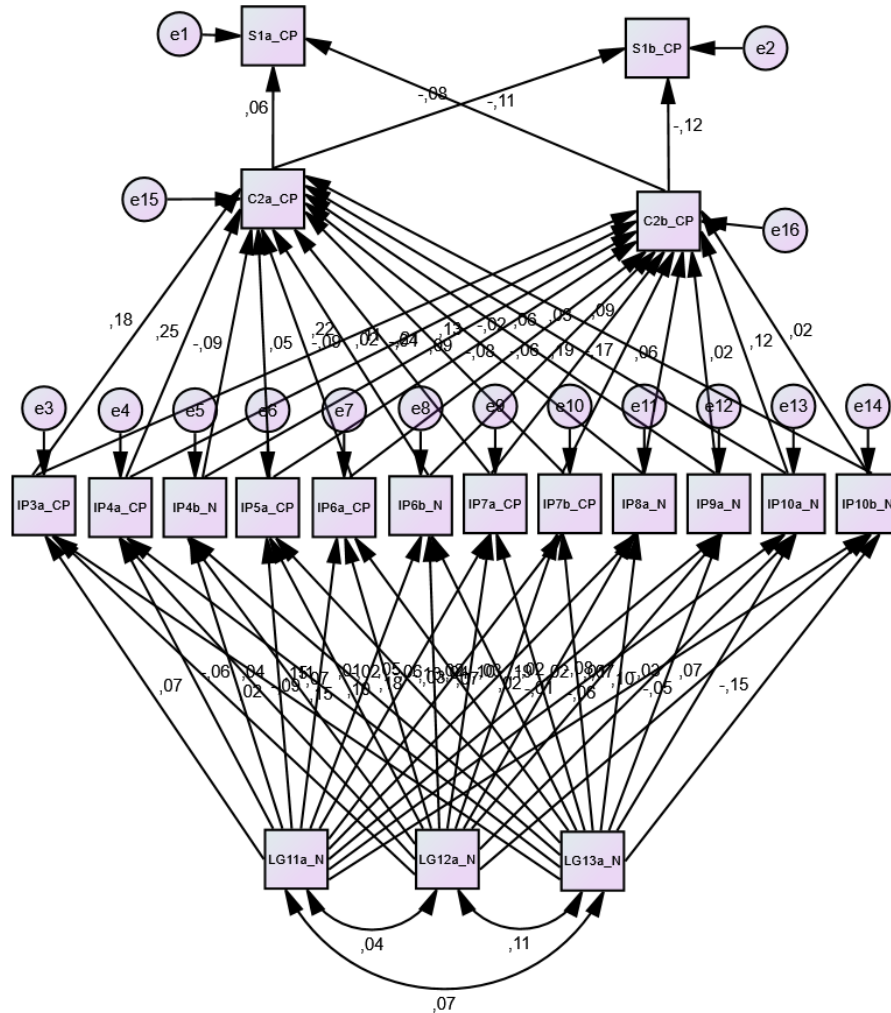
Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values

Part 2 of 2

	IP10a_N	IP6b_N	IP6a_CP	IP4b_N	IP4a_CP	IP3a_CP	C2b_CP	C2a_CP
IP10b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	0,037	-0,024	-0,041	0,020	0,138***	0,152***	0,000	0,000
C2a_CP	-0,035	0,010	-0,049	0,028	0,220**	0,106**	0,000	0,000
S1b_CP	-0,002	0,002	0,005	-0,003	-0,020	-0,017	-0,081	-0,042
S1a_CP	-0,002	0,001	-0,001	0,001	0,005	0,000	-0,024	0,036

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values

Appendix 4: Structural causal models for data set 1 (N=185 tax offices)



Note: **1a-CP** = Realized amount of regular remittance (%); **1b-CP** = Realized amount of extra effort remittance (%); **2a-CP** = Filing ratio of annual income tax returns by corporate and self-employed taxpayers (%); **2b-CP** = Proportion of corporate and self-employed taxpayers made tax payments (%); **3a-CP** = Effectiveness of tax socialization (%); **4a-CP** = Proportion of tax returns lodged via e-filing (%); **4b-N** = Realized on-time excellent service delivery (%); **5a-CP** = Share of newly registered taxpayers making payments (%); **6a-CP** = Share of successful tax inquiries (%); **6b-N** = Approved random audit proposals (%); **7a-CP** = Audit coverage ratio (%); **7b-CP** = Proportion of non-disputed tax assessment (%); **8a-N** = Completed imprisonment proposal for unpaid tax arrears (%); **9a-N** = Realized information reporting upon indication of tax crime (%); **10a-N** = Data feeding for tax potential; **10b-N** = On-time data archiving and documentation; **11a-N** = Share of employees met standard training hours; **12a-N** = Realized organizational performance dialogue and action plan monitoring; **13a-N** = Budget execution quality

**Standardised total effects arising from structural causal models for data set 1
(N=185 tax offices)**

Part 1 of 2

	LG13a_N	LG12a_N	LG11a_N	IP10b_N	IP5a_CP	IP7a_CP	IP7b_CP	IP8a_N	IP9a_N
IP10b_N	-0,154**	-0,047	-0,058	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,035	-0,022	0,151**	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,024	-0,024	0,048	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,007	0,033	-0,095	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	0,071	-0,015	0,072	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	-0,033	-0,083	0,024	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	0,067	0,103	-0,010	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,192***	-0,044	0,014	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	-0,095	-0,055	0,108	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,178**	0,069	0,043	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	0,098	-0,091	-0,057	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	0,155**	0,025	0,069	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	0,047	-0,004	0,039	0,021	0,092	0,189***	-0,170**	0,063	0,021
C2a_CP	0,040	-0,028	-0,014	0,094	0,054	0,206***	0,128	-0,025	0,061
S1b_CP	-0,009	0,003	-0,004	-0,010	-0,016	-0,039	0,011	-0,006	-0,007
S1a_CP	-0,003	-0,001	-0,005	0,003	-0,007	-0,009	0,026	-0,008	0,001

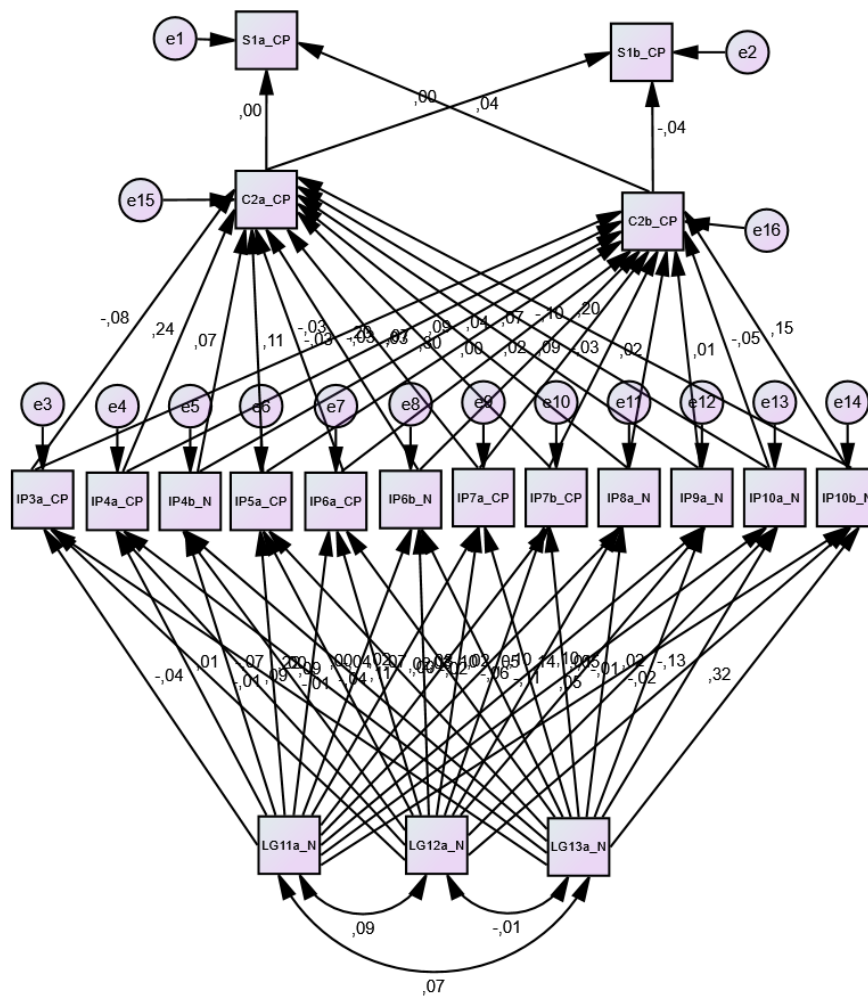
Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values

Part 2 of 2

	IP10a_N	IP6b_N	IP6a_CP	IP4b_N	IP4a_CP	IP3a_CP	C2b_CP	C2a_CP
IP10b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	0,117	-0,059	-0,084	-0,045	0,106	0,215***	0,000	0,000
C2a_CP	0,026	0,019	-0,087	-0,087	0,245***	0,182***	0,000	0,000
S1b_CP	-0,017	0,006	0,017	0,012	-0,032	-0,041	-0,124	-0,076
S1a_CP	-0,012	0,008	0,005	0,000	0,002	-0,014	-0,111	0,055

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values

Appendix 5: Structural causal models for data set 2 (N=167 tax offices)



Note: **1a-CP** = Realized amount of regular remittance (%); **1b-CP** = Realized amount of extra effort remittance (%); **2a-CP** = Filing ratio of annual income tax returns by corporate and self-employed taxpayers (%); **2b-CP** = Proportion of corporate and self-employed taxpayers made tax payments (%); **3a-CP** = Effectiveness of tax socialization (%); **4a-CP** = Proportion of tax returns lodged via e-filing (%); **4b-N** = Realized on-time excellent service delivery (%); **5a-CP** = Share of newly registered taxpayers making payments (%); **6a-CP** = Share of successful tax inquiries (%); **6b-N** = Approved random audit proposals (%); **7a-CP** = Audit coverage ratio (%); **7b-CP** = Proportion of non-disputed tax assessment (%); **8a-N** = Completed imprisonment proposal for unpaid tax arrears (%); **9a-N** = Realized information reporting upon indication of tax crime (%); **10a-N** = Data feeding for tax potential; **10b-N** = On-time data archiving and documentation; **11a-N** = Share of employees met standard training hours; **12a-N** = Realized organizational performance dialogue and action plan monitoring; **13a-N** = Budget execution quality

**Standardised total effects arising from structural causal models for data set 2
(N=167 tax offices)**

Part 1 of 2

	LG13a_N	LG12a_N	LG11a_N	IP10b_N	IP5a_CP	IP7a_CP	IP7b_CP	IP8a_N	IP9a_N
IP10b_N	0,316***	-0,021	0,051	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,005	-0,039	0,220***	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,139	-0,085	0,021	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,013	-0,016	0,021	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	-0,047	-0,099	-0,021	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	0,017	0,098	-0,062	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	-0,130	-0,007	-0,105	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,052	0,026	-0,005	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	0,098	0,073	0,005	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,107	0,089	-0,075	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	-0,040	0,091	0,013	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	-0,006	-0,008	-0,040	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	0,063	-0,001	0,081	0,150**	0,302***	0,086	-0,032	0,022	0,007
C2a_CP	0,080	0,013	0,045	0,197***	0,112	0,075	0,094	0,041	0,066
S1b_CP	-0,002	0,000	-0,003	-0,006	-0,011	-0,003	0,001	-0,001	0,000
S1a_CP	0,003	0,000	0,004	0,007	0,013	0,004	-0,001	0,001	0,000

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values

Part 1 of 2

	IP10a_N	IP6b_N	IP6a_CP	IP4b_N	IP4a_CP	IP3a_CP	C2b_CP	C2a_CP
IP10b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP5a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP7b_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP8a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP9a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP10a_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP6a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4b_N	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP4a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
IP3a_CP	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
C2b_CP	-0,051	0,025	0,003	0,029	0,197***	-0,029	0,000	0,000
C2a_CP	-0,102	-0,029	-0,029	0,067	0,242***	-0,082	0,000	0,000
S1b_CP	0,002	-0,001	0,000	-0,001	-0,008	0,001	-0,037	-0,002
S1a_CP	-0,003	0,001	0,000	0,001	0,009	-0,001	0,043	0,003

Note: *** = $\rho \leq 0.01$; ** = $\rho \leq 0.05$; * = $\rho \leq 0.10$; shaded area indicates positive values