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Power, trust and tax compliance: Evidence from clusters of countries

Marius-Razvan Surugiu[1+]
Raluca Mazilescu[2]
Camelia Surugiu[3]

[1,2]*Institute of National Economy, 13 Calea 13 Septembrie, Bucharest, Romania.*
[1]*Email: mariussurugiu@ince.ro*
[2]*Email: ralucamazilescu@ince.ro*
[3]*Faculty of Administration and Business, University of Bucharest, 4-12 Regina Elisabeta Blvd., Bucharest, Romania.*
[3]*Email: cameliasurugiu@faa.unibuc.ro*

(+ Corresponding author)

ABSTRACT

Tax compliance is important for public revenues, programs, and services that can improve people's quality of life and the provision of public goods. The analysis focuses on the long-run relationships between tax compliance (taxpayers' behavior), public trust in politicians (trust in authorities), and the rule of law (power of the authorities). The analysis uses unbalanced panel data for 68 countries from 2007–2017 and on clusters of countries. A positive shock in trust positively affects tax compliance in the short term in the case of East Europe, Africa and the Middle East, and Confucian Asia clusters. A positive shock in power positively affects tax compliance in the case of the Anglo and Africa and Middle East clusters. Trust and power impact tax compliance and differ depending on the analyzed groups. A collaborative relationship between the authorities and the taxpayer might be obtained by providing well-functioning institutions, being open and transparent about their work, and instilling confidence. These aspects are essential in any economy because the results may be related to increased compliance.

Contribution/Originality: This paper is focused on the impact analysis of two important indicators of compliance behavior in the context of specific clusters of countries. The study's results and the impact of the power and trust variables on tax compliance might be helpful to tax authorities in improving the policies in the area of taxation.

1. INTRODUCTION

The revenues of the public budgets are important for financing social programs and public investment. The theory of taxation includes the idea that the government's target differs from those of the taxpayers. The public budget increasingly needs financial resources, and taxpayers want to pay as little tax as possible. Therefore, it is essential to identify measures to increase taxpayers' compliance with the tax law, creating a relationship of trust between the tax administration and taxpayers by using its power through legislation.

Public programs created by the government in the area of education, health, infrastructure, etc., are vital for the development of society. Therefore, the government is constantly trying to identify new ways of attracting revenue to finance public goods, an essential aspect of the nexus between citizens and the state. How to attract revenue is an important policy that requires efficient management of public finances. Also, tax compliance is important for

creating trust between taxpayers and authorities. Tax compliance significantly impacts business activity, investment level and employment and can be encouraged by maintaining clear rules.

Tax compliance may be influenced by variables such as power and trust in authorities Kirchler, Hoelzl, and Wahl (2008). This concept takes into account economic and psychological factors, with an emphasis on the nexus between taxpayers and authorities.

In the literature, culture, institutions, and various economic aspects were found to have an influence (Alesina & Giuliano, 2015; Fernandez, 2011; Guiso, Sapienza, & Zingales, 2006), and some works also underline the connection between culture and tax policy (Alesina & Angeletos, 2005; Benabou & Tirole, 2006).

The government may adopt various measures in the area of taxation to discourage tax evasion (for example, through audits and fines, i.e., the power of the authorities), thus stimulating tax compliance, but the development of a relationship of trust with taxpayers through services and support is also essential. Therefore, this framework emphasizes the link between taxpayers and authorities, which is referred to in the literature as the "slippery slope" framework.

Tax compliance is about fulfilling tax obligations, timely reporting, and paying taxes. This research is focused on the link between the variables of tax compliance (taxc), trust in authorities (public trust in politicians), and the power of authorities (the rule of law). Data for 68 countries from 2007 to 2017 (unbalanced panel) were taken from the World Bank and Eurostat. Vector error correction (VEC) models are built for the case of the clusters of countries, and the results show the relationship between tax compliance, trust, and the authorities' power.

The next section shows the findings from the literature, Section 3 discusses the methodology, Section 4 includes the analysis and discusses the results, and Section 5 contains the conclusions of the paper.

2. LITERATURE REVIEW

In the "slippery slope" framework, tax compliance (taxpayers' behavior) is determined by two important aspects: the authority's trust and power (Kirchler et al., 2008) with an emphasis on discouraging tax evasion (audits and fines) and the trust relationship with taxpayers (services and support). The "slippery slope" is related to the negative impact on tax compliance due to low power and trust (Prinz, Muehlbacher, & Kirchler, 2014). Compliance is enforced when it is related to power (tax legislation, population's support, and misconduct information). Compliance is voluntary when is related to trust (interest of the tax authorities in the common good) (Batrancea et al., 2019; Kastlunger, Lozza, Kirchler, & Schabmann, 2013; Kirchler et al., 2008; Pukeliene & Kažemekaityte, 2016).

A low coercive power or a high legitimate power is related to a confidence-based interaction climate (Gangl, van Dijk, van Dijk, & Hofmann, 2020). Coercive power has a negative relation with trust and tax compliance (Gangl, Hofmann, Hartl, & Berkics, 2020).

Power and trust influence tax compliance. Regarding the trust variable, there is a negative link between tax compliance and taxpayers' confidence in state authorities (Brezeanu, Dumiter, Ghiur, & Todor, 2018). Trust in the government influences tax compliance (Jimenez & Iyer, 2016). Tax compliance may be positively associated with trust (Erul, 2020a; Tsikas, 2020) with an essential impact on tax compliance (D'Attoma, 2020; Kasper, Kogler, & Kirchler, 2015; Lisi, 2019; Mas' ud, Abd Manaf, & Saad, 2019). Taxpayers' trust impacts tax compliance (Nasution, Santi, Husaini, Fadli, & Pirzada, 2020). A low level of trust is related to increased tax non-compliance (Williams, 2020).

Regarding the power variable, the results from the literature show an influence on tax compliance (Erul, 2020b; Kasper et al., 2015; Kogler, Muehlbacher, & Kirchler, 2015). Audits and the rule of law (power variables) positively influence tax compliance (Erul, 2020a). Audit probability affects individual taxpayers' compliance (Palil, Hamid, & Hanafiah, 2013). Audit and penalty rates influence tax compliance (Ali, Cecil, & Knoblett, 2001). The likelihood of being audited influences tax compliance (Engida & Baisa, 2014). Tax compliance is positively influenced by audits, but is negatively influenced by high fines (Ntiamoah, Sarpong, & Winful, 2019). Noncompliance is connected to a

low level of audit probability (Ştefura, 2013). A specific combination of trust and authorities' power may improve tax compliance (Brata & Riandoko, 2020; Mas'ud, Abd Manaf, & Saad, 2014).

When discussing voluntary and enforced tax compliance, trust may be positively related to the former (Inasius, Darijanto, Gani, & Soepriyanto, 2020; Mardhiah, Miranti, & Tanton, 2019; Yasa & Martadinata, 2018). Power and trust do not influence enforced tax compliance (Inasius et al., 2020). Enforced compliance is slightly affected by trust and power (Chong, Yusri, Selamat, & Ong, 2019). There is a connection between the perception of audit probability, sanction severity, and enforced tax compliance (Liu, 2014). Penalties (power variable) influence taxpayers' voluntary compliance (Tilahun, 2018).

In the literature, some studies analyze the relationship between cultural variables (such as power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, long/short-term orientation, indulgence/restraint (see (Hofstede, Hofstede, & Minkov, 2010)) and tax variables. If we discuss the topic of taxation in relation to cultural features, some works from the literature obtained exciting results. Differences in compliance behavior are closely related to those between tax institutions and government behavior, and these factors can be explained by cultural aspects (Cummings, Martinez-Vazquez, & McKee, 2001).

Differences in behavior from country to country are based on aspects related to tax administration and citizens' attitudes towards government, i.e., a high level of trust in government, civil servants, and the legal system leads to increased tax compliance. For example, taxpayers in Botswana have a higher degree of compliance than those in South Africa, and taxpayers in the USA have higher tax morale than those in South Africa (Cummings, Martinez-Vazquez, McKee, & Torgler, 2004).

The analysis of the impact of cultural differences in a country (such as Switzerland, Belgium, Spain, and countries with a particular cultural diversity) indicates that the cultural environment does not substantially affect tax morale. For example, Switzerland has a strong interaction between culture and institutions. In Belgium, only minor differences were observed between the Flemish and Walloon inhabitants. In Spain, the lowest tax morale was identified in Navarre, but was higher in the Basque Country (Torgler & Schneider, 2004).

The results of the examination of tax morale among individuals from several European nations and the USA show that tax morale varies by country. Compared to Spain, the US has substantially higher tax morale, and the social norm of compliance is higher in the US than in Spain. The United States, Austria, and Switzerland are the three nations where people have high tax morale. High tax morale levels in the US and Switzerland may be a sign that direct democratic components need to be strengthened in order to boost tax morale. Additionally, there is a significant inverse relationship between the size of the underground economy and the level of tax morale in those countries. The findings suggest that northern European countries have greater tax morale than Romanic nations (Alm & Torgler, 2006).

Both Switzerland's and Spain's tax morale are influenced by regional and cultural variances. For instance, national pride, support for democracy, and confidence in the judicial system have an important impact on tax morale (Benno Torgler & Schneider, 2007).

Tax evasion can be explained by national culture based on an analysis of the impact of a nation's culture on tax compliance in different countries. Higher (lower) levels of individualism are related to lower (higher) tax evasion, whereas higher (lower) levels of uncertainty avoidance and power distance are associated with higher (lower) levels of tax evasion within nations. High levels of uncertainty avoidance, low individuality, low masculinity, and high power distance define the characteristics of a nation with tax non-compliance (Tsakumis, Curatola, & Porcano, 2007).

In Nigeria, tax evasion in the domain of personal income is positively impacted by law enforcement and trust in government, according to the analysis of the culture and tax evasion nexus (Uadiale, Fagbemi, & Ogunleye, 2010). According to the research on how culture affects the ethical decisions of tax professionals in New Zealand, attitudes toward tax compliance, subjective norms, perceived behavioral control, masculinity, and uncertainty avoidance have

a high impact on the desire to comply with the law. The avoidance of uncertainty negatively impacts the intention to comply with tax law. The higher the uncertainty avoidance index, the more likely tax professionals are to be involved in tax evasion (Abdul Hamid, 2013).

Any effort to increase tax compliance in China should emphasize the worth of taxes for public funding of family and community welfare. Confucianism has an impact on social and personal ethical standards. The best method for lowering the amount of non-compliance in the area of individual income tax is to establish a relationship between compliance and ethical behavior. The method used by Confucianism to achieve compliance is moral persuasion (Young, Lei, Wong, & Kwok, 2016).

Research on purposeful tax non-compliance in Malaysian businesses reveals a strong correlation with power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation (Radzia, 2020). Indulgence has a positive and significant effect on tax performance. Power distance, individualism, and long-term orientation have a negative and significant impact in various African countries (Olaniyi & Akinola, 2020).

Confucian culture has an inverse relationship with tax avoidance behavior in the case of Chinese businesses. Corporate tax evasion and Confucian culture have a negative relationship. Confucian culture discourages corporate tax evasion behavior (Chen, Xu, & Jebran, 2021). Research on how culture affects the explanations for tax cheating in various nations reveals that masculinity and the avoidance of uncertainty reduce the rationale for tax cheating, while individualism and power distance boost the justification (Bani-Mustafa, Al Qudah, Damrah, & Alameen, 2020).

In the literature, various authors have analyzed the nexus between cultural and tax variables. In this study, the analysis is carried out for a group of 68 countries and focuses on clusters of countries based on cultural features.

3. MATERIALS AND METHODS

This study uses an annual dataset from 2007–2017 (unbalanced panel) for 68 countries. The analysis is focused on clusters of countries, i.e., the Anglo cluster, the West Europe cluster, the East Europe cluster, the Africa and Middle East cluster, the Southern Asia cluster, the Confucian Asia cluster, and the Latin America cluster (see Appendix A). This classification is adopted because there are culturally distinct clusters of nations, and within each group, across three to four cultural value orientations, countries are comparable (House, Hanges, Javidan, Dorfman, & Gupta, 2004; Menzies, 2015). The variables in the analysis are as follows: tax compliance (taxc), trust in politicians (trust in authority), and the rule of law (power of authority) (see Table 1).

Table 1. List of variables.

Variable	Abbreviation	Unit	Source
Tax compliance (Taxpayer's behavior)	Taxc	% (Ratio of tax revenue to gross domestic product)	World Bank
Public trust in politicians	Trust	Index	
The rule of law	Power		

For 68 nations between 2007 and 2017, these factors may highlight the impact of trust and power on tax compliance. The impulse response function that was developed is explained in the following section, along with the integration properties and the vector error correction (VEC) model. This research is focused on the long-term relationship between the taxc, power, and trust variables. A VEC model is employed to highlight the dynamic processes of the variables and how they recover from a shock to reach equilibrium.

4. RESULTS AND DISCUSSION

The investigation focuses on the correlation between the trust and power characteristics and tax compliance (taxc). The panel unit root and cointegration tests, the creation of the panel VEC model, and the impulse function were all taken into account when developing this study.

The ratio of tax revenue to GDP is the variable for taxc. Tax revenue refers to transfers made to the central government that are required to be used for public purposes. Fines, penalties, and social contributions are not included. Refunds and adjustments for incorrectly collected tax money are regarded as negative revenues.

The trust variable gauges how effective the government is. It describes people's perceptions of the government's dedication to such initiatives, the quality of policy formation and implementation, and public service quality.

The power variable highlights how much agents adhere to social norms, and specifically, how well contracts are respected and property rights are safeguarded, how efficiently the police and courts run, and how likely it is that crimes and violent acts will occur. More heightened enforcement of tax policy is correlated with more legal control. The level of compliance might be raised by increasing the power.

4.1. Panel Unit Root (PUR) Tests

All variables should have the same properties prior to cointegration tests. The variables ought to be integrated in the same order (see Appendix B). The series are integrated of order one and stationary in the first difference. The cointegration analysis is developed in the section that follows.

4.2. Cointegration Tests

Pedroni residual cointegration test (Pedroni, 1999, 2004) and the Kao residual cointegration test (Kao, 1999) are employed to check the variables' relationships (see Appendix C). According to the results, there are cointegrating relationships in the developed models.

For the four clusters (Anglo, Eastern European, Africa and Middle East, and Confucian Asia), as well as for the world panel (all 68 countries in a single group), most of the results from the Pedroni and Kao residual cointegration tests indicate that the alternative hypothesis is accepted. Thus, the variables are cointegrated with a long-term relationship.

In the case of three clusters (West Europe, Southern Asia, and Latin America), the analysis shows no cointegration of the variables. Therefore, further research has been developed without considering these clusters.

The results of unit root and cointegration tests show that the variables under study have a unit root, I(1), and that the non-stationary series are cointegrated. Thus, the next step in the analysis is represented by developing the VEC models. These models and the impulse function analysis were created for all 68 countries considered in a single group (world panel) and for the clusters for which the cointegration analysis indicated such relationships.

4.3. Panel VEC Model

The cointegration is confirmed in the case of four country clusters (Anglo, Eastern European, Africa and Middle East, and Confucian Asia), as well as in the case of the world panel (all 68 countries). The non-stationary series have a property called cointegration. The VEC model is used to examine the type of non-stationarity of the variables. The long-term components of variables can adhere to equilibrium requirements in the VEC model (Engle & Granger, 1987).

This type of analysis shows the return speed to equilibrium after a shock. The equations developed for all countries (world panel), and by cluster, are presented in Table 2.

A long-run causality relationship is observed from the independent variable to the dependent variable. The first value in the equation for the group with all 68 countries is the speed of adjustment required to achieve long-term equilibrium (0.150, considered as an annual percentage) for the whole system. The coefficients of the independent variables show their short-term effects ceteris paribus on the dependent variable (each independent variable changes by 1%).

Table 2. VEC models.

Cluster	VEC model	
World (R-squared = 0.24)	$\Delta \text{taxc}_t = -0.150 \times (\text{taxc}_{t-1} + 1.850 \times \text{trust}_{t-1} - 4.316 \times \text{power}_{t-1} - 22.386) + 0.126 \times \Delta \text{taxc}_{t-1} - 0.113 \times \Delta \text{trust}_{t-1} - 1.652 \times \Delta \text{power}_{t-1} - 0.114$	(1)
The Anglo cluster (R-squared = 0.19)	$\Delta \text{taxc}_t = -0.057 \times (\text{taxc}_{t-1} - 76.486 \times \text{power}_{t-1} + 6.045 \times \text{trust}_{t-1} + 89.501) + 0.053 \times \Delta \text{taxc}_{t-1} - 2.480 \times \Delta \text{power}_{t-1} - 0.998 \times \Delta \text{trust}_{t-1} - 0.109$	(2)
The East Europe cluster (R-squared = 0.08)	$\Delta \text{taxc}_t = -0.001 \times (\text{taxc}_{t-1} + 175.475 \times \text{trust}_{t-1} - 13.705 \times \text{power}_{t-1} - 445.380) - 0.136 \times \Delta \text{taxc}_{t-1} + 0.939 \times \Delta \text{trust}_{t-1} - 2.623 \times \Delta \text{power}_{t-1} - 0.079$	(3)
The Africa and Middle East cluster (R-squared = 0.05)	$\Delta \text{taxc}_t = -0.011 \times (\text{taxc}_{t-1} + 25.825 \times \text{trust}_{t-1} - 18.290 \times \text{power}_{t-1} - 99.569) - 0.155 \times \Delta \text{taxc}_{t-1} + 0.499 \times \Delta \text{trust}_{t-1} - 1.322 \times \Delta \text{power}_{t-1} - 0.120$	(4)
The Confucian Asia cluster (R-squared = 0.14)	$\Delta \text{taxc}_t = -0.034 \times (\text{taxc}_{t-1} + 1.111 \times \text{trust}_{t-1} - 1.181 \times \text{power}_{t-1} - 16.746) - 0.338 \times \Delta \text{taxc}_{t-1} + 0.012 \times \Delta \text{trust}_{t-1} + 1.287 \times \Delta \text{power}_{t-1} - 0.058$	(5)

4.4. Impulse Response Function

In this step, the impact of a shock in trust and power on tax compliance over the analyzed period is explained (see Figure 1).

The impact of a positive shock on trust is seen in Figure 1(a), with a negative effect beginning in the first year for the first two clusters (World and Anglo clusters) and a positive effect followed by a negative one for the last three clusters (East Europe, Africa and Middle East, and Confucian Asia). In the case of the Anglo cluster, after the fifth year, the trend shows signs of returning to the positive area of the chart. The trends for the Africa and Middle East and the Confucian Asia clusters seem to vary close to the horizontal line compared to the situation of the other three groups.

In Figure 1(b), the accumulated response indicates a negative effect in the case of the first two clusters (World and Anglo clusters) starting from the first year. The negative impact begins from the third year in the case of the East Europe cluster, from the fourth year in the case of the Africa and Middle East cluster, and from the fifth year in the case of the Confucian Asia cluster. By group, there are no signs of returning to the positive area of the graph. The trend varies close to the horizontal line for the last two clusters.

A positive shock in power is depicted in Figure 1(c), which has an adverse effect on the World cluster for the first two years and a positive impact for the third year. For the Africa and Middle East cluster, there is a positive effect from the first year. In the case of the other two groups (Anglo and Confucian Asia clusters), there is a positive effect at the beginning of the period, which becomes negative (starting at the seventh year for the Anglo cluster and the second year for the Confucian Asia cluster), with signs of turning to the positive area of the graph after the 10th year. The trend for the East Europe cluster is negative starting from the first year, without noticing an improvement.

Regarding the accumulated response, Figure 1(d) depicts a shock in power that first has a negative impact in the case of the World cluster for the first three years before switching to a positive impact in the fourth year. There are positive effects for the Anglo and Africa and Middle East clusters starting from the first year. In the case of the other groups (East Europe and Confucian Asia clusters), there is a negative effect from the beginning of the period.

For both variables (trust in and power of authorities), the trends vary close to the horizontal line in the case of the Africa and Middle East cluster and the Confucian Asia cluster. Also, considering the bigger picture, for the World, Anglo, and Africa and Middle East clusters, a positive effect is generated only by the power variable, while trust has a negative impact.

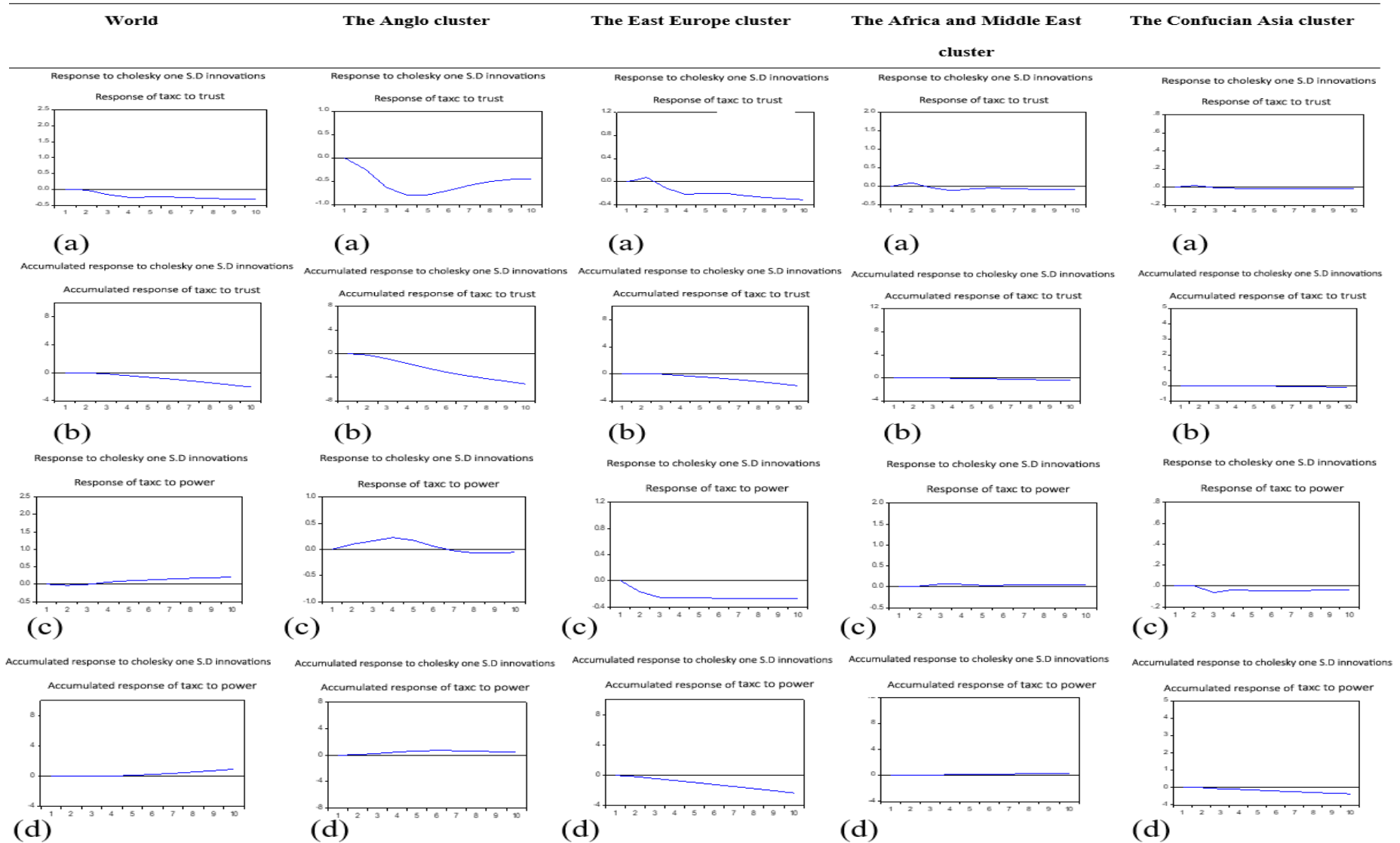| World	The Anglo cluster	The East Europe cluster	The Africa and Middle East cluster	The Confucian Asia cluster

Figure 1. Tax compliance's (Taxc) impulse response function. (a) Tax compliance's response to trust (public trust in politicians); (b) Tax compliance's accumulated response to trust; (c) Tax compliance's response to power (the rule of law); and (d) Tax compliance's accumulated response to power.

5. CONCLUSIONS

This research empirically examines the long-run links between tax compliance, trust in authority, and the power of authority. The degree of tax compliance was explained by the trust (in) and authority's power for clusters such as World, Anglo, East Europe, Africa and Middle East, and Confucian Asia. The cointegration method is employed, along with the VEC model and impulse functions. The long-run relationships between variables are presented based on the VEC model analysis. The results obtained differ when the research focuses on the clusters of countries. Some works have noted that compliance is positively and critically impacted by people's trust in the authorities. (Abdu, Jibir, & Muhammad, 2020; Ali & Ahmad, 2014; Budiman & Inayati, 2021; D'Attoma, 2020; Erul, 2020b; Haning, Hamzah, & Tahili, 2020; Inasius et al., 2020; Kasper et al., 2015; Kogler et al., 2015; Lisi, 2019; Mardhiah et al., 2019; Mas' ud et al., 2019; Nasution et al., 2020; Tsikas, 2020; Yasa & Martadinata, 2018). Additionally, past research has demonstrated a significant and favorable association between authority's power and tax compliance (Ali et al., 2001; Appah & Wosowei, 2016; Engida & Baisa, 2014; Erul, 2020a; Inasius, 2019; Kirchler et al., 2008; Ntiamoah et al., 2019; Nzioki & Osebe, 2014; Palil et al., 2013; Saeed, Zubair, & Khan, 2020; Ştefura, 2013; Tilahun, 2018). According to the impulse function, a positive shock in trust has a favorable impact on tax compliance before a negative impact in the case of the East Europe cluster, the Africa and Middle East cluster, and the Confucian Asia cluster. In the case of the Africa and Middle East cluster, a positive shock in the power variable has a beneficial impact on tax compliance as early as the first year. In the case of Anglo and Confucian Asia clusters, there is a positive effect at the beginning of the period, followed by a negative effect. Only the power variable has a large and beneficial impact, whereas the Anglo, World, and Africa and Middle East clusters are negatively affected by trust. By examining the impact of two key indicators on compliance behavior in the context of the clusters, this research adds to the body of knowledge on tax compliance. The study's findings and the effects of power and trust variables on tax compliance may be helpful to tax authorities in enhancing taxation strategies. One limitation is related to the data set employed in the study. This study only examined 68 nations between 2007 and 2017 and did not consider the implications of Brexit or the Covid-19 pandemic. The use of additional countries and a longer time frame can be considered as future study objectives. This approach could result in some intriguing new findings. In order to have a fuller picture of tax behavior, subsequent research should also look at how tax compliance is related to other factors such as the gross domestic product and labor market indicators. A collaborative relationship between the authorities and the taxpayer might be obtained by providing well-functioning institutions, being open and transparent about their work, and instilling confidence. These aspects are of major importance in any economy because the result may lead to an increase in tax compliance.

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The Anglo cluster	The West Europe cluster		The East Europe cluster		The Africa and Middle East cluster		The Southern Asia cluster	The Confucian Asia cluster	The Latin America cluster	
United Kingdom	Germany	Portugal	Hungary	Poland	Namibia	Zambia	India	Singapore	Mexico	Chile
United States	Austria	Sweden	Georgia	Greece	Turkey	Zimbabwe	Indonesia	Korea, Rep.	Argentina	Peru
Australia	Switzerland	Denmark	North Macedonia	Slovenia	Morocco	Ethiopia	Philippines	China	El Salvador	Costa Rica
Canada	Belgium	Finland	Croatia	Romania	Egypt, Arab Rep.	South Africa	Malaysia		Colombia	Guatemala
New Zealand	Netherlands	Norway	Czech Republic	Russian Federation	Cameroon		Nepal	Thailand	Trinidad and Tobago	Brazil
Ireland	Italy	Israel	Latvia	Kazakhstan	Jordan	Ghana	Bangladesh			
			Estonia	Bulgaria						
	France		Ukraine	Bosnia and Herzegovina						
			Serbia	Albania						

Appendix B. Panel unit root (PUR) test statistics.

World				
Variables	Levin, Chu, and Chu (2002)	Breitung (2000)	ADF (ADF - Fisher Chi-square; ADF - Choi Z-stat)	PP (PP - Fisher Chi-square; PP - Choi Z-stat)
Level				
taxc	-0.188	2.327	173.816	192.733
			2.146	2.576
trust	1.419	-0.593	121.554	126.017
			5.081	7.095
power	-2.316*	3.753	245.387	301.958***
			-1.270	-2.025*
First difference				
D(taxc)	-58.243***	-4.094***	1018.520***	1072.820***
			-23.4340***	-24.479***
D(trust)	-37.896***	-0.000	888.708***	790.468***
			-20.943***	-18.871***
D(power)	-31.122***	-9.527***	1070.810***	1062.230***
			-24.529***	-24.344***

Note: * $p < 0.05$, *** $p < 0.001$.

Appendix B. PUR test statistics (cont.).

The Anglo cluster				
Variables	Levin et al. (2002)	Breitung (2000)	**ADF** **(ADF - Fisher Chi-square; ADF - Choi Z-stat)**	**PP (PP - Fisher Chi-square; PP - Choi Z-stat)**
Level				
taxc	-1.573	0.649	12.647	12.805
			-0.701	-0.691
trust	2.303	1.813	1.935	1.552
			2.942	4.176
power	-0.39	1.073	7.916	7.311
			0.332	0.607
First difference				
D(taxc)	-8.921***	-3.819***	68.884***	59.777***
			-6.297***	-5.829***
D(trust)	-4.759***	1.554	43.036***	40.745***
			-3.494***	-3.217***
D(power)	-9.826***	-2.703**	77.451***	77.206***
			-7.129***	-7.012***

Note: ** $p < 0.01$, *** $p < 0.001$.

Appendix B. PUR test statistics (cont.).

The West Europe cluster				
Variables	Levin et al. (2002)	Breitung (2000)	**ADF** **(ADF - Fisher Chi-square; ADF - Choi Z-stat)**	**PP (PP - Fisher Chi-square; PP - Choi Z-stat)**
Level				
taxc	1.029	1.724	10.892	14.423
			2.069	1.584
trust	-1.038	-0.205	17.300	13.759
			0.425	1.412
power	-0.311	0.393	16.162	21.393
			1.0310	1.485
First difference				
D(taxc)	-9.161***	-0.999	94.114***	136.611***
			-6.525***	-8.809***
D(trust)	-9.666***	-1.970*	103.993***	118.999***
			-7.260***	-8.106***
D(power)	-8.753***	-0.636	92.300***	137.310***
			-6.712***	-8.953***

Note: * $p < 0.05$, *** $p < 0.001$.

Appendix B. PUR test statistics (cont.).

The East Europe cluster				
Variables	Levin et al. (2002)	Breitung (2000)	ADF (ADF - Fisher Chi-square; ADF - Choi Z-stat)	PP (PP - Fisher Chi-square; PP - Choi Z-stat)
Level				
taxc	-1.004	-0.427	34.313	46.537
			0.179	0.179
trust	1.589	-0.424	15.895	18.783
			3.064	3.919
power	-3.313***	4.049	50.258	41.588
			-0.415	1.149
First difference				
D(taxc)	-16.761***	-1.654*	181.452***	183.801***
			-10.193***	-10.211***
D(trust)	-12.320***	-1.600	150.741***	139.092***
			-8.488***	-7.920***
D(power)	-11.465***	-3.789***	170.961***	175.803***
			-9.426***	-9.721***

Note: * $p < 0.05$, *** $p < 0.001$.

Appendix B. PUR test statistics (cont.).

The Africa and Middle East cluster				
Variables	Levin et al. (2002)	Breitung (2000)	ADF (ADF - Fisher Chi-square; ADF - Choi Z-stat)	PP (PP - Fisher Chi-square; PP - Choi Z-stat)
Level				
taxc	-1.877*	-2.221*	22.200	21.174
			-0.579	-0.067
trust	-0.082	-2.053*	13.529	14.697
			1.216	3.116
power	-2.012*	0.695	22.934	29.849
			-1.011	-1.736*
First difference				
D(taxc)	-9.412***	-0.459	92.826***	136.982***
			-7.196***	-9.248***
D(trust)	-9.530***	-3.371***	93.071***	84.351***
			-7.110***	-6.647***
D(power)	-6.388***	-0.986	64.395***	116.728***
			-5.037***	-8.127***

Note: * $p < 0.05$, *** $p < 0.001$.

Appendix B. PUR test statistics (cont.).

The Southern Asia cluster				
Variables	**Levin et al. (2002)**	**Breitung (2000)**	**ADF** **(ADF - Fisher Chi-square; ADF - Choi Z-stat)**	**PP (PP - Fisher Chi-square; PP - Choi Z-stat)**
Level				
taxc	0.401	-0.625	5.186	8.536
			1.604	1.779
trust	0.827	-1.267	3.662	2.430
			1.731	3.144
power	-2.008*	1.231	19.809	17.722
			-1.499	-1.335
First difference				
D(taxc)	-5.542***	-1.507	42.691***	53.702***
			-4.228***	-5.044***
D(trust)	-6.473***	-0.226	50.873***	43.840***
			-5.007***	-4.371***
D(power)	-4.832***	-0.967	35.834***	56.387***
			-3.951***	-5.487***

Note: $* p < 0.05, *** p < 0.001.$

Appendix B. PUR test statistics (cont.).

The Confucian Asia cluster				
Variables	**Levin et al. (2002)**	**Breitung (2000)**	**ADF** **(ADF - Fisher Chi-square; ADF - Choi Z-stat)**	**PP (PP - Fisher Chi-square; PP - Choi Z-stat)**
Level				
taxc	-0.335	1.602	4.190	3.579
			0.593	1.246
trust	-0.441	-0.902	8.159	7.637
			-0.331	0.165
power	1.897	0.794	4.404	6.920
			1.305	0.410
First difference				
D(taxc)	-6.285***	1.050	35.143***	43.323***
			-4.298***	-4.841***
D(trust)	-11.140***	0.203	38.082***	21.886**
			-4.381***	-2.933**
D(power)	-3.392***	-1.275	18.099*	39.489***
			-2.443**	-4.782***

Note: $* p < 0.05, ** p < 0.01, *** p < 0.001.$

Appendix B. PUR test statistics (cont.).

The Latin America cluster				
Variables	**Levin et al. (2002)**	**Breitung (2000)**	**ADF** **(ADF - Fisher Chi-square; ADF - Choi Z-stat)**	**PP (PP - Fisher Chi-square; PP - Choi Z-stat)**
Level				
taxc	-2.582**	1.440	23.654	18.493
			-0.686	-0.100
trust	-1.435	-0.744	18.377	17.752
			-0.320	0.184
power	-1.819*	1.069	20.256	26.950
			-0.851	-0.963
First difference				
D(taxc)	-10.739***	0.603	86.760***	113.514***
			-5.929***	-8.432***
D(trust)	-7.435***	-0.416	70.307***	69.827***
			-5.537***	-5.395***
D(power)	-9.385***	-2.604**	90.689***	81.720***
			-6.884***	-6.180***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Cointegration tests.

World								
Pedroni residual cointegration test							**Kao residual cointegration test**	
	Trend assumption: No deterministic trend		**Trend assumption: Deterministic intercept and trend**		**Trend assumption: No deterministic intercept or trend**		**Trend assumption: No deterministic trend**	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	**Weighted statistic**	**Statistic**	**Weighted statistic**	**Statistic**	**Weighted statistic**	**t-statistic**	
Panel v-statistic	0.364	-2.619	-1.480	-7.407	3.311***	-7.142	ADF	-8.051***
Panel rho-statistic	0.291	2.180	4.118	6.571	-0.026	1.115	Residual variance	15.511
Panel PP-statistic	-15.904***	-7.181***	-12.815***	-11.313***	-2.434**	-1.263	HAC variance	14.604
Panel ADF-statistic	-21.254***	-9.690***	-12.980***	-10.980***	-3.403***	-2.809**		
	Alternative hypothesis: Individual AR coefficient (Between dimensions)							
	Statistic							
Group rho-statistic	6.253		9.460		5.633			
Group PP-statistic	-11.773***		-18.997***		-6.695***			
Group ADF-statistic	-13.425***		-13.264***		-12.850***			

Note: ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Cointegration tests (cont.).

The Anglo cluster

Pedroni residual cointegration test							Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend		Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (within dimensions)							
	Statistic	Weighted statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-statistic	
Panel v-statistic	–0.195	–0.723	–1.438	-2.098	0.071	-1.072	ADF	–3.451***
Panel rho-statistic	0.954	0.535	2.024	1.567	0.179	0.116	Residual variance	1.272
Panel PP-statistic	–0.780	–2.129*	0.824	–2.033*	–1.702*	–1.720*	HAC variance	1.195
Panel ADF-statistic	–3.019**	–4.736***	–2.066*	–3.343***	–3.053**	–2.269*		
	Alternative hypothesis: Individual AR coefficient (between dimensions)							
	Statistic							
Group rho-statistic	1.892		2.804		1.198			
Group PP-statistic	–1.545		–2.422**		–1.837*			
Group ADF-statistic	–4.883***		–3.143***		–3.750***			

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

Appendix C. Cointegration tests (cont.).

The West Europe cluster

Pedroni residual cointegration test							Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend		Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	Weighted Statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-statistic	
Panel v-statistic	0.042	–0.547	–1.879	–2.436	–1.467	–2.177	ADF	–0.900
Panel rho-statistic	0.467	0.245	2.583	2.434	0.687	0.059	Residual variance	0.666
Panel PP-statistic	-2.065*	–2.843**	–1.132	–2.585**	–1.538	–1.718*	HAC variance	0.669
Panel ADF-statistic	-2.035*	–1.606	–0.249	–1.525	–2.798**	–2.556**		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)							
	Statistic							
Group rho-statistic	1.826		3.459		2.023			
Group PP-statistic	–2.931**		–3.495***		–2.864**			
Group ADF-statistic	–0.731		–0.577		–5.286***			

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

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Appendix C. Cointegration tests (cont.).

The East Europe cluster								
Pedroni residual cointegration test							Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend		Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	Weighted statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-statistic	
Panel v-statistic	-0.106	-0.768	-2.655	-3.119	-2.253	-2.605	ADF	-1.744*
Panel rho-statistic	0.022	0.493	2.131	2.406	0.302	0.147	Residual variance	1.581
Panel PP-statistic	-5.797***	-4.169***	-7.213***	-7.160***	-2.495**	-1.898*	HAC variance	1.017
Panel ADF-statistic	-5.479***	-4.381***	-5.212***	-5.068***	-4.419***	-4.590***		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)							
	Statistic							
Group rho-statistic	2.522		3.958		1.557			
Group PP-statistic	-5.864***		-9.047***		-5.723***			
Group ADF-statistic	-4.788***		-5.123***		-8.520***			

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Cointegration tests (cont.).

The Africa and Middle East cluster								
Pedroni residual cointegration test							Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend		Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	Weighted statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-Statistic	
Panel v-statistic	-1.046	-0.606	-2.396	-2.229	-1.669	-2.244	ADF	-1.348
Panel rho-statistic	0.105	-0.182	1.238	1.383	-0.362	0.486	Residual variance	4.269
Panel PP-statistic	-6.954***	-6.474***	-6.177***	-5.944***	-2.343**	-0.421	HAC variance	2.482
Panel ADF-statistic	-2.205*	-3.053**	-2.371**	-2.896**	-1.906*	-3.052**		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)							
	Statistic							
Group rho-Statistic	1.176		2.445		1.219			
Group PP-Statistic	-12.164***		-7.108***		-3.675***			
Group ADF-Statistic	-2.340**		-1.114		5.812			

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Cointegration tests (cont.).

The Southern Asia cluster

Pedroni residual cointegration test							Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend		Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	Weighted statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-statistic	
Panel v-statistic	−0.167	0.126	4.555*	−0.164	−0.918	−1.394	ADF	1.244
Panel rho-statistic	1.327	0.962	1.371	1.476	0.841	0.759	Residual variance	0.664
Panel PP-statistic	1.790	0.462	−1.471	−1.836*	0.620	0.304	HAC variance	0.980
Panel ADF-statistic	0.588	0.191	−0.616	−1.741*	0.364	0.265		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)							
	Statistic							
Group rho-statistic	2.087		2.368		1.600			
Group PP-statistic	0.545		−2.110*		0.188			
Group ADF-statistic	0.220		−1.682*		−0.081			

Note: * $p < 0.05$.

Appendix C. Cointegration tests (cont.).

The Confucian Asia cluster

Pedroni residual cointegration test						Kao residual cointegration test	
	Trend assumption: No deterministic trend		Trend assumption: Deterministic intercept and trend		Trend assumption: No deterministic intercept or trend	Trend assumption: No deterministic trend	
	Alternative hypothesis: Common AR coefficients (Within dimensions)						
	Statistic	Weighted statistic	Statistic	Weighted statistic	Statistic	Weighted statistic	t-statistic
Panel v-statistic	1.383	−0.976	1.184	−1.694	−1.147	−1.050	ADF	−0.024
Panel rho-statistic	0.165	0.794	0.544	1.672	0.779	0.401	Residual variance	0.366
Panel PP-statistic	−3.606***	−1.197	−14.474***	−4.712***	0.310	−0.360	HAC variance	0.221
Panel ADF-statistic	−2.504**	−3.391***	−4.325***	−5.369***	0.148	−0.491		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)						
	Statistic						
Group rho-statistic	1.576		1.956		1.473		
Group PP-statistic	−2.787**		−11.168***		−0.779		
Group ADF-statistic	−3.678***		−5.300***		−1.545		

Note: ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Cointegration tests (cont.).

The Latin America cluster								
Pedroni residual cointegration test							**Kao residual cointegration test**	
	Trend assumption: No deterministic trend		**Trend assumption: Deterministic intercept and trend**		**Trend assumption: No deterministic intercept or trend**		**Trend assumption: No deterministic trend**	
	Alternative hypothesis: Common AR coefficients (Within dimensions)							
	Statistic	**Weighted statistic**	**Statistic**	**Weighted statistic**	**Statistic**	**Weighted statistic**	**t-statistic**	
Panel v-statistic	0.282	0.056	-0.906	-1.756	-1.065	-1.904	ADF	-0.995
Panel rho-statistic	1.197	0.301	1.765	1.501	0.706	0.248	Residual variance	1.505
Panel PP-statistic	0.566	-2.581**	-0.908	-2.754**	-0.547	-1.255	HAC variance	1.032
Panel ADF-statistic	-1.918*	-2.475**	-0.268	-1.228	-2.737**	-2.429**		
	Alternative hypothesis: Individual AR coefficients (Between dimensions)							
	Statistic							
Group rho-statistic	1.946		2.831		2.225			
Group PP-statistic	-2.842**		-2.540**		-0.459			
Group ADF-statistic	-4.582***		-1.348		-4.996***			

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.