Maastricht University

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Institutional Trust and Economic Growth

Project: Economics Case Studies

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Abstract

Adverse developments in trust towards public institutions highlight the urgency to understand its determinants to a larger extent. The current literature supports a causal link between economic development and trust in institutions but fails to provide empirical evidence of a causal impact of economic growth on trust in institutions. This paper evaluates how economic development impacts institutional trust using the concept of Granger causality on the country level and the Dutch regional level. We measure economic growth using growth rates in Gross Domestic Product (GDP) and institutional trust using a trust in government index. We find a significant Granger causality relationship between the growth of trust in institutions and economic growth at the OECD level. This relationship goes both ways, indicating a positive feedback loop between the growth of institutional trust and economic growth. Further, in a second analysis using voter turnout ratios, we do not find such a positive feedback loop between economic growth and the growth rate of voter turnout ratios. Instead, we find that the growth rates of voter turnout ratio Granger causes economic growth.

In an attempt to perform a similar analysis on the regional level of the Netherlands, we find that there are no decent proxy variables for trust in public institutions that ensure unbiased results in the relationship between economic growth and institutional trust. Instead, we perform an analysis to investigate the causal relationship between economic growth and political participation in terms of voter turnout ratios. We find a positive feedback loop between economic growth and voter turnout ratios implying that both variables help to explain the other. This result implies that the regional differences in voter turnout ratios within the Netherlands can be reduced by increasing economic development in the economically weak regions of the Netherlands.

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1. Introduction

Trust in institutions is an essential pillar of today's modern democratic societies. It plays an essential role in ensuring social and economic progress. However, during the last few decades, there has been a growing concern regarding decreasing levels of public trust that are contributing to the endorsement of radical ideological perspectives, increasing public discontent, protests, and in some cases violent conflict (Perry, 2021). This highlights the need to cultivate confidence in public institutions to ensure sustained economic development. Commissioned by and in collaboration with the Directorate for Knowledge, International and European Affairs & Macro-economics (KIEM) of the Ministry of the Interior and Kingdom Relations of the Kingdom of The Netherlands, we analyse the impact of economic development on trust in institutions using national data of OECD countries and regional data of the Netherlands. The main question this research aims to answer is the following:

Does economic development affect trust in institutions?

A comprehensive literature review is conducted to investigate the relationship between economic development and trust in democratic institutions. The existing literature provides strong theoretical underpinnings for a two-way causal link between these concepts, however, it fails to show empirical evidence of a causal impact of economic growth on trust in institutions. We use the concept of Granger causality, to examine the predictive significance of economic development in explaining trust in institutions. Data on institutional trust is not available on the regional level of the Netherlands. We therefore consider voter turnout ratios in elections as a proxy measure of trust in Dutch public institutions. Based on a correlation analysis performed on the OECD level, we do not find that voter turnout ratios are a good proxy variable for trust in institutions. Therefore, our analysis on the regional level is concerned with the question of whether economic development affects political participation on the regional level of the Netherlands.

At the OECD level, our results suggest that GDP growth Granger causes changes in institutional trust. Simultaneously, we find that changes in trust in institutions also Granger cause GDP growth. In other words, both variables have significant predictive power for the other, creating a positive reinforcement loop between the two. Further, when looking at the indirect measure of trust; voter turnout ratios, the results differ. Our analysis for the OECD also suggests that there is

no significant effect of past GDP growth on present changes in voter turnout ratios. On the other hand, our results indicate that growth in voter turnout ratios precedes negative GDP growth rates. In contrast to the analysis on the OECD level, findings on the regional level suggest that past improvements in GDP growth precede higher levels of voter turnout ratios. The analysis of the reverse relationship yields a similar finding, indicating a positive feedback loop between economic growth and voter turnout ratios in the Netherlands at the regional level.

This report is outlined as follows: Section 2 provides a literature review on measuring trust in institutions, the role of trust in institutions on economic growth, and the reverse relationship, i.e., the role of economic growth on trust in institutions. Thereafter, Section 3 discusses trust in institutions in the Netherlands and the regional difference regarding trust. Section 4 explores the methodological approach of Granger causality. Section 5 outlines the data that is used and elaborates on the strength of voter turnout ratios as a measure of trust in institutions. Section 6 presents the results as well as their discussion. Finally, Section 7 offers concluding remarks.

2. Literature Review

First, we provide a discussion on different measurements of trust in institutions. This includes direct measures of trust which are usually based on opinion surveys as well as indirect measures of trust which can be used when survey data is not available. Then, we outline the role of trust in institutions on economic growth. Finally, we examine the determinants of trust in institutions. This includes a discussion of institutional and cultural theories on the origin of political trust as well as an analysis of the current literature on the role of economic growth on trust in institutions.

2.1 Trust in Institutions

Trust is integral to ensure the functioning of any society (Perry, 2021). This includes trust towards each other as well as trust towards public institutions and the government. In this paper, trust is defined as “a person’s belief that another person or institution will act consistently with their expectations of positive behaviour” (OECD, p.44, 2017). This definition is based on the OECD guidelines on measuring trust and is closely related to the definition of Fehr (2009). It is important

to emphasise that various sources use different definitions and approaches in measuring trust.

Conventional measurements of trust toward institutions are based on opinion surveys. Political trust was first measured in 1958 as part of the US National Election Study (NES) using a number of survey questions. It can be questioned, however, to what extent these questions accurately tap the notion of political trust (Seyd, 2016). Instead, the NES items have been found to evaluate the attitude toward incumbent political actors (Citrin, 1974; Hill, 1981). Since then, most national and international surveys have discarded the approach used in the NES, and instead use a simpler indicator. These indicators tend to comprise a single item that explicitly refers to trust without providing a reference point against which trust is to be measured (Seyd, 2016). This gives rise to multiple concerns that one needs to be aware of. First, a single-item indicator has difficulties measuring the underlying facets of trust with a single question. Second, there might be variation in the understanding of trust among the survey participants. Finally, different attitudes among respondents are not captured properly.

While single-item indicators have flaws, they also exhibit some benefits compared to multi-question indicators. These include that single-item indicators regarding trust have been asked in consistent ways for long periods of time and across various countries, that the question is simple and short, and that the wording of the question is neutral (Seyd, 2016). This becomes evident in the "Trust in government indicator" published by the OECD. The survey uses a single-item indicator for trust that asks the respondents "In this country, do you have confidence in [national government]?" (OECD, 2023). With all the caveats we just made, this provides a consistent measure that can give comparable data across countries. Finally, one should mention that both types of indicators, single and multi-item, are subject to issues arising from surveys. Individual's opinions do not necessarily reflect the respondent's actual behaviour (Perry, 2021). This implies that trust can affect behaviour in non-linear ways.

To conclude, indicators of trust might only partially measure the underlying concept of trust. As the literature on measurements of trust evolves, questionnaires become more nuanced and may be more capable of capturing the underlying factors of trust. Besides measures of opinion surveys on trust, there are also indirect measures of trust toward institutions that have been used. These alternative measures are especially viable on a regional level where survey data is lacking. Grönlund and Setälä (2007) use data on voter turnout ratios as an indirect measure of trust in political institutions. The authors argue that trust in parliament as well as satisfaction with

democracy has a positive impact on voter turnout. This evidence is based on the first round of the European Social Survey in which data from 22 countries has been collected in the time period 2002-2003. These results are in line with the findings by Cox (2003). The author uses data on the European Parliament election in 1999 and finds that voting turnout is strongly and significantly correlated with trust in political institutions. These findings suggest that voter turnout is a reasonable estimate for trust in institutions. Opposing this view are findings by Wang (2016a). The author finds only a weak relationship at best between political trust and voter turnout. Hooghe (2017) argues that political trust is closely related to various forms of electoral behaviour. However, these behaviours affect political trust differently, possibly leading to a non-linear relationship. On the one hand, political trust tends to stimulate voter turnout as distrusting citizens are less motivated to cast a vote. Further, taking part in elections can boost levels of political trust. It is however not clear whether this effect is limited to supporters of the winning party. On the other hand, low levels of political trust have been associated with anti-incumbent voting as well as populist voting. Table 1 provides a concise overview of the key findings from the relevant papers contributing to the discussion of measuring trust and the use of voter turnout as a proxy.

Based on this discussion the strength of voter turnout ratios as a proxy for trust in institutions is ambiguous. Unfortunately, there is no extensive survey data available for institutional trust on the regional level. Therefore, relying on voter turnout ratios might be the only viable option to assess trust in institutions on a regional level. To summarise, trust in institutions is conventionally measured on a national level using survey data based on either single- or multi-item questionnaires. As such survey data is generally not available at the regional level, indirect measures of trust have been used as a proxy, including voter turnout ratios.

Table 1: The literature on the determinants of trust

Author	Short description	Main results	Remarks
Section 1: Trust in Institutions			
Perry, 2021	UN policy brief on the trends of trust in institutions and its implications for economic security. Provides a good discussion on different trust measures (surveys, voter turnout, consumption of bottled water)	- Decline in trust in public institutions in recent decades. - Economic security and perception of poor government performance is linked to declines in institutional trust.	Mentions the link between economic growth and trust in institutions but does not discuss the causal flow
Seyd, 2016	Critical analysis of survey measures of institutional trust.	- Discusses different characteristics of opinion surveys and their limitations in capturing institutional trust. - Trade-off between single- and multi-item trust indicators.	
Citrin, 1974; Hill 1981	Discussion on the role of trust and its measurement	- Finds that the US National Election Study (NES) measure the attitude towards political actors instead of the trust in the political institutions.	
Grönlund and Setäla, 2007	Investigate the relationship between voter turnout and political trust. Hypothesise that trust in parliament drives institutional trust opposed to that trust in politicians drive institutional trust	- Finds that trust in parliament has a positive impact on turnout, and that satisfaction with democracy increases turnout. - At the individual level, especially trust in parliament increases the likelihood of voting	

Cox, 2003	Investigates the relationship between voter turnout and different measures of trust (interpersonal, political, and parliamentary)	- Finds that there is no positive correlation between NP turnouts and interpersonal trust measures. - Significant correlation (0.488) between EP turnout and Political institutional trust - Insignificant correlation (0.363 with p=0.12) between NP turnout and political trust	Focus is on the analysis of EU countries
Wang, 2016a	Among other things, Wang investigates the relationship between political trust and voter turnout.	- Finds a weak or no direct relationship between political trust and voter turnout.	Empirical evidence is from Taiwan, the US, and the UK.
Hooghe, 2017	Investigates the role of political trust in electoral behaviour	- Distrusting citizens are less likely to vote. - Low levels of trust are associated with populist voting - Taking part in elections can stimulate trust	Concludes that the causal role of political trust within the different voting behaviours need to be further researched

2.2 Trust in Institutions as a Determinant of Economic Development

Governments can provide economic stability by enforcing and defending property rights and by providing oversight ensuring the accountability of transaction partners in the marketplace to private citizens (Campbell, 2009). This reduces uncertainties and risks associated with economic activity and allows market participants to allocate their resources efficiently (Barro, 1996). The importance of institutions for economic growth has long been established. Acemoglu, Johnson, and Robinson (2005) develop the theoretical and empirical case that differences in economic institutions are the fundamental cause of differences in economic development. The authors argue that economic institutions influence the structure of economic incentives in society so that ultimately, the quality of economic institutions impacts economic performance as well as the distribution of resources. The authors use historical data on mortality rates as an instrumental

variable for the quality of present institutions and estimate their impact on economic growth. Dell (2010) finds comparable results by examining historical data from areas in South America and comparing them to areas with different sets of institutions that share similar cultural and geographical backgrounds. Dell (2010) finds that the differences in institutions have a significant persistent impact on investment and economic outcomes in the present. These analyses are focused on economic institutions. Acemoglu, Johnson, and Robinson (2005), however, recognize the importance of political institutions as they determine the constraints and incentives of actors in the economy. These claims are supported by Alesina et al. (1996). The authors argue that political instability increases uncertainty which adversely affects household decisions on investment and savings and therefore economic development. Doucouliagos and Ulubasoglu (2008) conduct a meta-analysis on the effects of democracy on economic growth. While one needs to differentiate between democracy and trust in institutions, there is a clear relationship between the two. Trust in the government and its institutions is a crucial component of a well-functioning democracy (Hetherington, 1998). Hetherington argues that without trust in public institutions, citizens become disengaged from politics which implies lower voter turnout ratios, a lack of support for democratic institutions, and less participation in civil activities. Further, as Citrin and Stoker (2018) show, a lack of trust in institutions reduces compliance regarding tax collection, regulations, and respect for property rights. Therefore, a lack of trust in institutions reduces the quality of institutions and has adverse impacts on economic outcomes. Doucouliagos and Ulubasoglu (2008) conclude that the quality of democracy has indirect effects on economic growth that operates through various channels. These channels include human capital accumulation, income distribution, and economic freedom (Alesina et al., 1996; Baum & Lake, 2003; and Sturm & de Haan, 2001). Rodrik (2000) adds that democracies, are more resilient to external shocks, and deliver better distributional outcomes compared to other forms of governments.

Table 2 provides a condensed summary of the key findings regarding the role of institutions in economic growth. The literature provides evidence of the importance of democracy and institutions in fostering economic growth. Trust feeds through multiple channels which affect the quality of democracy and institutions. Consequently, trust has important indirect implications for economic growth.

Table 2: The literature on the importance of trust in institutions for economic growth

Author	Short description	Main results	Remarks
Section 2: Trust in Institutions as a determinant of economic development			
Acemoglu, Johnson, and Robinson (AJR), 2005	Theoretical and empirical analysis of the role of institutions on economic growth. Use of an IV (settler mortality) for the quality of institutions and their impact on economic growth	- Economic institutions are the fundamental cause of differences in economic development. - Recognize the importance of both, economic and political institutions. - Institutions influence the structure of economic incentives and the distribution of resources	Focuses on the role of institutions instead of mentioning trust directly
Dell, 2010	Similar to AJR (2005), Dell makes the argument that differences in institutions explain differences in investments and economic outcomes. Use of a RDD by comparing similar countries that differed in institutions in the past.	- Finds that the differences in institutions have a significant persistent impact on investment and economic outcomes in the present	The analysis is focused on economic institutions (labour systems)
Doucouliagos and Ulubasoglu, 2008	Conduct a meta-analysis on the role of democracy on economic growth	- Conclude that democracy indirectly affects economic growth through various channels (*see below)	Focus is on democracy.

Hetherington, 1998; Citrin and Stoker, 2018	The role of trust in institutions on society	- A lack of institutional trust results in lower voter turnouts, lacking support for democratic institutions, less participation in civil activities. Further it reduces compliance regarding tax collection, regulations and respect for property rights.	
Alesina et al., 1996; Baum and Lake, 2003; Sturm and de Haan, 2001; Rodrik, 2000	Investigate related topics of political stability, democracy, and economic freedom in relation to economic growth.	- (*) Find indirect channels through which democracy affects economic growth. These include human capital accumulation, income distribution, economic freedom, and political stability. - Further, democracies are found to create greater stability and predictability in the long run, are more resilient to external shocks, and deliver better distributional outcomes compared to other forms of governments.	These indirect factors are similar to the factors that relate institutions to economic growth.

2.3 Determinants of Trust in Institutions

While the above section focuses on the importance of trust in institutions on economic growth, the focus of this paper is on the determinants of trust in institutions. Therefore, this section elaborates on institutional and cultural theories of trust. Next, we discuss subjective economic performance and objective macroeconomic performance as drivers of trust.

The literature on political trust considers institutional theories of political trust and cultural theories of political trust (Wang, 2016b). The two theories view trust as endogenous or exogenous to political institutions, respectively. Institutional theories view political trust as a consequence of political performance, whereas cultural theories see political trust as determined outside the political sphere (Mishler & Rose, 2001). A short overview of the discussion is provided in Table 3. Supporters of the cultural approach argue that political trust stems from cultural values and beliefs that have been learned through socialisation in early life (Mishler & Rose, 2001; Wong, Wan, & Hsiao, 2011). Further, they argue that peoples' evaluations of government performance depend on cultural norms and values that are subjective to each individual (Almond & Verba, 1963; Inglehart, 1997). This implies that institutional performance cannot be measured on an aggregate level as every individual assigns their own meanings and values to every outcome (Misher & Rose, 2001). The cultural approach has received a considerable amount of empirical support (e.g.: Lee, 1994; Shi, 2001). Simultaneously, however, many scholars observe decreasing levels of political trust in almost all established democracies in recent decades (Perry, 2021). Based on the cultural approach of political trust, the recent developments are attributed to systematic changes in fundamental values (Inglehart, 1997). These include political radicalism and postmaterialism (Catterberg & Moreno, 2006), traditionalism (Wong, Hsiao, & Wan, 2009), and authoritarianism (Ma, 2007). Wang (2016b) does not find a significant relationship between these cultural factors and political trust in East Asia. In line with the findings of Mishler and Rose (2001) and Wong, Wan, and Hsiao (2011), the author concludes that the cultural approach is less powerful than the institutional approach which uses changes in government performance as the underlying factor to explain variation in political trust. The institutional approach assumes that political trust arises from a rational response of individuals based on the performance of political institutions (North, 1990). Based on this approach, political trust increases if individuals are under the impression that the government is delivering good policies (Wang, 2016b). Contrary, political institutions that do not perform well result in distrust and skepticism among the population toward the government.

Table 3: Two theories of institutional trust

Author	Short description	Main results	Remarks
Section 3: Determinants of Trust in Institutions			
Wang, 2016b	Provides an overview on different theories regarding the origin of trust in institutions. Estimates the impact of subjective government performance and corruption on political trust in 3 Asian countries. Use of empirical implications of theoretical model framework (EITM).	- Finds no empirical support of the cultural theories of trust in institutions. (In line with findings by North (1990)) - Finds that an increase in the subjective measure of government performance increases the probability of placing trust in the institutions. Further, there is a negative interaction effect of government performance and the perception of corruption on political trust.	Wang uses the empirical implications of the theoretical model (EITM) framework to address the causal link between performance and trust. While the EITM framework provides a systematic approach to causal inference, it cannot solve the problem of reverse causality.
Mishler and Rose, 2001; Wong, Wan, & Hsiao, 2011; Almond & Verba, 1963; Inglehart, 1997	This cluster of literature supports the cultural approach in the origin of trust.	- Essentially, according to the cultural approach, political trust stems from cultural values and beliefs that are learned early in life. - Related to this, some papers argue that the evaluation of government performance depends on cultural norms and values that differ between each individual. - Recent developments in trust are attributed to systematic changes in fundamental values. (**)	

Lee, 1994; Shi, 2001	Investigate the determinants of political trust.	- Find that both, national economic conditions as well as cultural values, determine trust in institutions in some Asian countries. - E.g., Shi (2001) finds that People from China differ in their cultural orientation to people from Taiwan which makes them react differently to similar government behaviour.	Use of OLS makes it difficult to conclude causal inference.
Catterberg & Moreno, 2006; Wong, Hsiao, & Wan, 2009; Ma, 2007	Investigate the causes of the recent patterns of declining political trust. Use of the cultural approach	- Find that (**) fundamental value changes are the reason for declining patterns of trust. These include political radicalism and postmaterialism, traditionalism, and authoritarianism.	Empirical findings by Wang (2016b) do not support this.

2.3.1 Subjective Macroeconomic Performance

Citizens that are satisfied with the performance of the economy tend to have more trust in political institutions (e.g., Citrin & Green, 1986; Elinas & Lamprianoun, 2014; and Uslaner, 2014). The strong relationship between subjective evaluations of macroeconomic performance and political trust can be found consistently across different regions of the world, including Eastern Europe (Rose & Mishler, 2011), Southeast Asia (Park, 2017; Wang, 2016b), Latin America (Zmerli & Castillo, 2015; Espinal, Hartlyn, & Kelly, 2006), the Arab region, and sub-Saharan Africa (Hutchison & Johnson, 2017). To provide a condensed summary of the key findings on the relationship between subjective evaluations of macroeconomic performance and political trust, Table 4 presents a comprehensive overview of these studies. Wang (2016b), for instance, estimates the impact of subjective government performance and corruption on political trust in three East Asian countries. The author relies on survey data from the Asian Barometer Survey in which government performance is measured by the degree of satisfaction of the respondent towards the government's performance on a scale from 0 to 3. Wang finds that a one-

unit increase in government performance increases the probability of placing political trust by 24.6 percent. Furthermore, he concludes that there is a negative interaction effect between government performance and the perception of corruption on political trust in a country. While corruption can exacerbate positive government performance on political trust, government performance cannot exacerbate the negative effect associated between corruption and political trust. Overall, Wang's findings imply that government competence and performance can increase political trust. Yet, these results should be taken with care. Wang uses the empirical implications of the theoretical model (EITM) framework to address the causal link between performance and trust. The idea of this framework is that empirical observations are built on a mathematical model that is based on a set of assumptions. This method intends to minimize non-falsifiable research practices. While the EITM framework provides a systematic approach to causal inference, it cannot solve the problem of reverse causality.

While the literature on subjective macroeconomic performance establishes a strong correlation between subjective economic evaluations and political trust, they fail to provide compelling evidence for the causal effect of the perception of economic performance on political trust.

Table 4: Literature on subjective performance

Author	Short description	Main results	Remarks
Section 3: Determinants of Trust in Institutions			
Subjective macroeconomic performance			
Citrin & Green, 1986; Elinas & Lamprianoun, 2014; and Uslaner, 2014	Investigate the role of subjective evaluations of macro-performances and political trust.	- Find that Citizens that are satisfied with the performance of the economy tend to have more trust in political institutions	

Rose & Mishler, 2011; Park, 2017; Wang, 2016b; Zmerli & Castillo, 2015; Espinal, Hartlyn, & Kelly, 2006; Hutchison & Johnson, 2017	A cluster of papers that establish the relationship across different regions. (See below)	- Rose and Mishler (2011) use survey data from 14 countries of Central and Eastern European and the former Soviet Union between 1993 and 2004 to establish a link. - Park finds a strong relationship for a number of countries in the Asian-Pacific region. Further analysed by Wang (2016b) (see Table 3) - Zmerli and Castillo (2015) investigate the effect of income inequality and subjective distributive fairness on trust in 18 Latin American countries using survey data from the Latinobarometer survey 2011. - Espinal et al. (2006) establish the relationship for the Dominican Republic using survey data from 1994 to 2001. - Hutchison and Johnson (2017) use survey data for the period 1999-2009 for Sub- Saharan Africa, and 2006-2011 for the Arab region.	Papers establish correlation but not causation

2.3.2 Objective Macroeconomic Outcomes

The relationship between objective macroeconomic outcomes and political trust is less evident. The literature provides mixed results on the relationship between economic outcomes and trust in institutions. Macroeconomic performance is found to have an effect on political trust in some studies (e.g., Anderson & Singer 2008; Bargsted et al., 2017, Marien, 2011; Rose & Mishler, 2011; Schäfer, 2012; Van Erkel & Van der Meer, 2016), but not in others (e.g., Dalton, 2004; Hakhverdian & Mayne, 2012; Oskarsson, 2010; Van der Meer & Hakhverdian, 2017; Zavecz, 2017). To provide a succinct overview of the diverse findings concerning the relationship between objective macroeconomic outcomes and political trust, Table 5 offers a condensed summary of these studies.

Different factors can be considered in the determination of the underlying mechanisms that lead to these differences. The choices regarding the dependent variable (e.g., trust in government or satisfaction with democracy) as well as the choice regarding the independent variable (e.g., economic growth, economic development, unemployment rate) are not able to explain the varying results (Van der Meer and Hakdverdian, 2017). Instead, two factors seem to explain the differences in the results. First, the use of cross-sectional or longitudinal data, and second, the inclusion of corruption as a control variable, (Van der Meer, 2018).

The body of literature using cross-national analysis does not reach a consensus. Some studies find that macroeconomic outcomes explain differences in political trust (Kotzian, 2011a, 2011b; Lee, 1994; Marien, 2011; Schäfer, 2012), while others find no or very weak effects (Hakhverdian & Mayne, 2012; Oskarsson, 2010; Van der Meer, 2010; Van der Meer & Hakhverdian, 2017). Within these cross-sectional results the main driver of differences seems to be the use of corruption as a control variable (Van der Meer, 2018). According to Van der Meer and Hakhverdian (2017), the effect of corruption on political trust is so strong that it tends to crowd out most of the other determinants. Therefore, when including corruption as a control variable in the cross-national analyses, macroeconomic outcomes become insignificant in explaining political trust. This is different when considering longitudinal analyses. Using longitudinal data, one can analyse the effect of macroeconomic outcomes on political trust through time. Using longitudinal analysis, Van Erkel and Van der Meer (2016) find that macroeconomic performance affects political trust in 15 European Union member states. Similar results are obtained by Kroknes et al. (2015) for the EU, and by Bargsted et al. (2017) in 17 Latin American countries. Bargsted et al. further find that increasing gross national income positively affects political trust while increasing income inequality harms it. These findings remain significant when controlling for corruption. The literature on objective macroeconomic outcomes fails to establish causality in the growth-trust relationship.

To conclude this section, the literature on trust in institutions offers two theories. The institutional approach views trust as endogenously determined by political performance. The cultural approach views trust as an exogenous variable meaning that political trust stems from cultural values and beliefs that have been learned through socialisation in early life. While both theories have some empirical support, the evidence favours the institutional approach. In evaluating the effect of economic performance on trust in institutions, the literature distinguishes between subjective

performance and objective macroeconomic performance. The literature on subjective performance finds a strong link between performance and trust. The relationship is less evident when considering macroeconomic performance. Results depend on whether the analysis is cross-sectional or longitudinal, and on the inclusion of corruption as a control variable. Given the empirical literature on the trust-growth relationship, an analysis using longitudinal data or panel data with the inclusion of corruption as a control variable is most convincing. Overall, however, the literature lacks a clear causal link between economic performance and trust in institutions.

Table 5: Literature on Objective macroeconomic outcomes

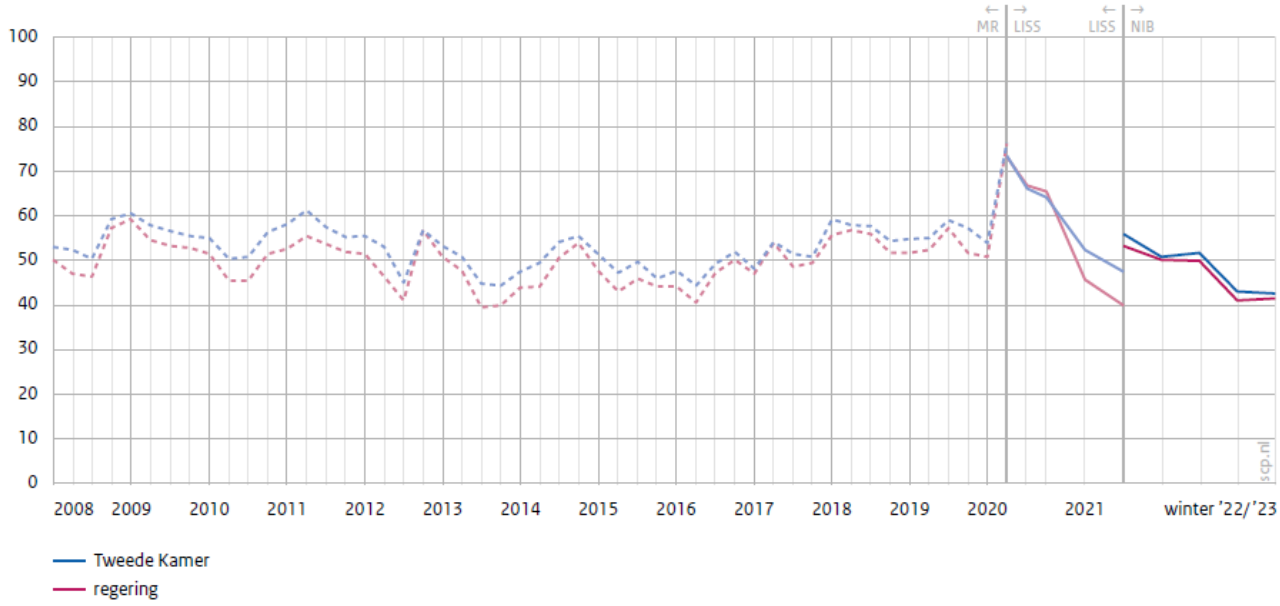
Author	Short description	Main results	Remarks
Section 3: Determinants of Trust in Institutions			
Objective Macroeconomic Outcomes			
Van der Meer, 2018	Overview about the literature on the relationship between trust and economic growth	- Concluded that there are two factors that determine whether a relationship is found or whether no relationship is found between performance and trust. These are the use of cross sectional vs. longitudinal data and the use of corruption as a control variable	The discussion is focused on correlation and not on causality
Kotzian, 2011a, 2011b; Lee, 1994; Marien, 2011; Schäfer, 2012	Cross-sectional analysis on the effect of performance on trust	- Finds that performance explains differences in political trust	No use of corruption as a control variable.
Hakhverdian & Mayne, 2012; Oskarsson, 2010; Van der Meer, 2010; Van der Meer & Hakhverdian, 2017	Cross-sectional with the inclusion of corruption as a control variable to analyse the effect of performance on trust	- Once controlling for corruption, the effects of macroeconomic outcomes do not relate to political trust	Use of corruption as a control variable.

Van Erkel & Van der Meer 2016; Kroknes et al, 2015; Bargsted et al., 2017	Longitudinal analysis to examine effect of performance on trust	- Even after controlling for corruption, the effects of macroeconomic outcomes on political trusts are significant	Use of corruption as a control variable.

3. Trust in Institutions in the Netherlands

In May 2023, Statistics Netherlands (CBS) highlighted the adverse development regarding citizens' confidence in politicians and democratic institutions in recent years (CBS, 2023a). More specifically, trust in the “Tweede Kamer” has reached its lowest value in the last quarter of 2022 since the first data collection in 2012. Similarly, in a recent report, the ‘Social en Cultureel Planbureau’ (SCP) discusses the adverse developments regarding trust towards the government and the parliament. The SCP acknowledges that levels in trust towards the government have been low in the past, such as during the financial crisis in 2012 and 2013 or the refugee crisis in 2016. Different from those events is, however, that following these events, trust has recovered rather quickly, while the current low levels of trust have been present since 2021 (den Ridder et al., 2023). These developments are depicted in Figure 1.

Figure 1: Trust in the Tweede Kamer and the government, population of 18+, 2008-winter 2022/2023

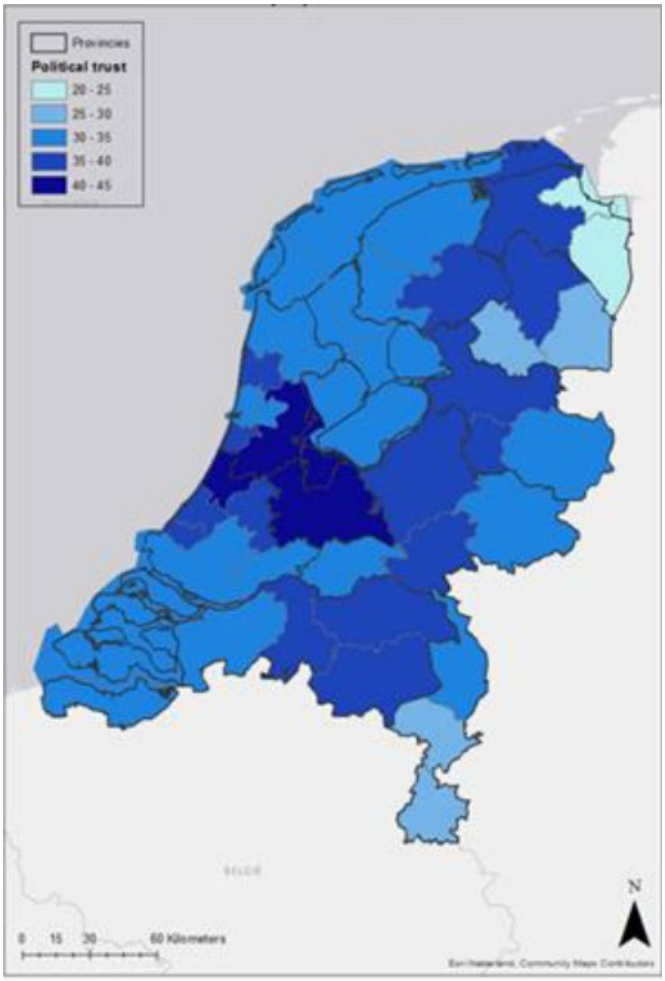


Note. Trust in the "Tweede Kamer" and the government of population that is above 18 between 2008 and winter 2022/2023. The vertical axis measures trust as the share of respondents that gave a score between 6-10 on a scale between 1 (no trust) and 10 (full trust). From "Burgerperspectieven 2023 bericht 2" by den Ridder et al., 2023. (https://www.scp.nl/publicaties/publicaties/2023/08/31/burgerperspectieven-2023-bericht-2)

These recent developments in institutional trust illustrate the importance of the topic for the Dutch government. The cause of the prolonged dip in trust is sought in a combination of political instability and the poor economic situation (Bovens & Wille, 2008). Besides the development of trust within the Netherlands, one can look at the regional differences regarding trust in institutions within the Netherlands.

One of the reasons for differences in trust in the Dutch public institutions between the core and peripheral regions of the Netherlands is the structural difference regarding trust in the central government. The provincial connectedness instead of the association with The Netherlands is greater among the peripheral regions (Kenne & Van Engeland, 2019). This is visible in Figure 2 which shows the score of political trust in the 40 COROP regions of the Netherlands (Weiland, 2019).

Figure 2: Map on political trust in COROP-regions



Note. Share of people that answered "yes" when being ask whether they had faith in the national government in a CBS survey (2018). From "Political trust in the Netherlands: A study on the relationship between political trust and geographical proximity" [Bachelor Thesis, Rijksuniversiteit Groningen] by Weiland, B, 2019. (https://frw.studenttheses.ub.rug.nl/id/eprint/2227)

Reasons for these differences can be traced back to historical events and cultural differences. There are also recent examples that may explain regional differences in trust towards the national government. For instance, the ongoing handling of the gas extraction victims in Groningen. Otjes et al. (2020) found that the gas extraction in Groningen, which caused man-made earthquakes, created a strong sense of distrust and discontent in the northern province. Recently, a report was published that justified the discontent of the people in Groningen. Moreover, this report confirmed

that the central government neglected the interests of the people in Groningen.

A different situation, but with similar consequences regarding the sentiment is the closure of mines in the South of Limburg. NOS (2015) argues that the effects are still visible after 50 years of closure (i.e., 1965-2015). Approximately 45,000 miners and 30,000 workers in related businesses lost their jobs that year, creating discontent towards the central government. The government moved several institutions, e.g., the CBS, to the region as a replacement. Together with two big manufacturers, DAF and DSM, these became the three large employers in the region. However, this was disrupted by the oil crises in the 1970s creating a second major round of job losses (NOS, 2015). These effects are still visible in the current data stating that Heerlen and Kerkrade are among the 10 most underprivileged regions in the Netherlands (NOS, 2015; Rietjens, 2020).

Furthermore, the 1953 North Sea flood (watersnoodramp) hit the coast of Belgium and the Netherlands. 2.100 people were killed, (Spuyman, 2023). Most casualties occurred in the southern province of Zeeland (NOS, 2023). The coast guard warned the government institutions several times about the bad state of the dikes (NPO Start, 2023). However, no action had been taken until the disaster occurred. A different event in 2000, the fireworks disaster in Enschede, caused the death of 23 people. The two involved factory directors were imprisoned due to negligence; yet, all the details were kept private. Moreover, no civil servants or politicians directly involved took responsibility or apologized. The lack of transparency by the government and the court of justice still causes a lack of trust in the central institutions in the region (Fleury, 2023).

The peripheral regions have experienced various events that have eroded trust in the central government. The prevailing sentiment in these regions is that citizens feel unheard by the central government in The Hague (Harmsen, 2023). Kanne and van England (2019) released a report on the consequences of these events and the regional association in the Netherlands, called ‘regio&provinciegevoel’ (i.e., feeling and association with a region or province). They found that in the three northern provinces and the three southern provinces, there is a stronger feeling of regional belonging compared to a feeling of national belonging. In contrast, the people in the core regions identify themselves with the Netherlands as a whole and their residential city instead of their province.

4. Methodology

To empirically test the causal relationship between economic growth and trust in institutions, we use the concept of Granger causality to investigate the causal link between economic growth and trust in institutions. This circumvents problems of reverse causality and omitted variable bias that would be present when using Ordinary Least Squares (OLS) regressions. Further, due to the lack of a suitable instrument variable (IV), we discard the instrumental variable approach. An IV is a variable that is correlated with the independent variable but not directly with the dependent variable. When feasible, this helps to mitigate endogeneity problems. Using Granger causality is in line with related literature on the relationship between economic growth and democracy (Heo & Tan, 2001; Dawson, 2003) and growth on economic freedom (Justesen, 2008).

The starting point of Granger causality is that the past can cause the present or the future, whereas the future cannot cause the past or the present (Granger, 1969). In other words, past values of a variable x may be a cause of the present value of another variable y, but future values of x cannot be a cause of present values of variable y (Justesen, 2008). We use Granger causality to answer the following question: Do changes in past economic growth precede changes in institutional trust? Using the above phrasing, we ask whether past changes in the independent variable GDP growth cause present changes in the dependent variable trust in institutions.

The mere fact that changes in GDP precede changes in trust in institutions is, however, no guarantee of a causal relationship. To control for other factors that are relevant in the explanation of the dependent variable one can use past values of the variable itself as well as unit-specific dummy variables (Gujarati, 2003, p.679). The optimal number of past values (lags) of the variables of interest is statistically determined using the Bayesian Information Criterion (BIC). This is in line with the empirical strategy performed by Juodis, Karavias, and Sarafidis (2021).

Further, we use the Juodis et al. (2021) test for non-causality that reports the coefficient to compare the strength and the direction of the link between the independent and dependent variables. The test is used to take cross-sectional heteroskedasticity in the error terms into account (Xiao et al., 2021). Cross-sectional heterogeneity refers to differences among individuals or groups that are not fully captured in the model. These unobserved variations can be an issue as

they bias the results of the analysis. Further, to investigate the causal relationship, it is important to avoid omitted variable bias. In this case, that may occur if a variable that is significantly correlated with the measures used for economic growth and institutional trust is left out of the model. The literature suggested corruption which shows a high correlation with both variables of interest (E.g., Hakhverdian, 2017; Van der Meer, 2018; Wang, 2016b). The inclusion of corruption as a control variable seems to be especially relevant in cross-sectional analyses where differences in corruption are large (Van der Meer, 2018). As we are working with panel data, the exclusion of corruption is less likely to change the direction of our results. Further, while the inclusion of corruption is possibly relevant on a country level as there are large variations in corruption across countries, this is less likely an issue when considering the regional level of the Netherlands. That is because the regions in the Netherlands share more similarities compared to different countries within the OECD.

Further, to perform the Granger non- causality test by Juodis et al. (2021), we need to ensure certain conditions that are similar to performing regular time-series analysis. These entail that there is no trend in the data (stationarity) and that the data shows the same variance over time (no heteroskedasticity).

5. Data

Our analysis revolves around two concepts, economic growth and trust in institutions. We provide an empirical analysis on two levels, one at the OECD level and the other at the Dutch regional level. To do so we collect data regarding economic development, trust in institutions, and voter turnout.

For the OECD sample, countries are selected based on two requirements. First, data needs to be strongly balanced meaning that there are no missing values in the time series data for any of the units. Second, countries with mandatory voting are excluded from the analysis. This is done to ensure that the decision of voting is taken by each individual and not exogenously imposed by the government. Appendix A (Table A1) provides an overview of the complete list of countries. To measure economic development at the OECD level we use yearly volume changes in GDP, extracted from the OECD database. Data on voter turnout ratios are retrieved from the

International Institute for Democracy and Electoral Assistance. On the OECD level, voter turnout ratios include data on Parliamentary, Presidential, and EU Parliament elections. Data on GDP growth and voter turnout ratios are collected for the period 1973 to 2021. Data on political trust, retrieved from the OECD database, is only available since 2006 resulting in a dataset ranging from 2006 to 2021. To meet the criterion of no trend in the data (stationarity) we perform an LM Hadri unit root test and conclude that all variables on the OECD level contain a unit root. We account for this by taking the first differences. Furthermore, all variables in the OECD sample suffer heteroskedasticity. To account for this we use robust standard errors in the Granger causality test.

For the Dutch regional sample, the selection of regions is done accordingly with level 3 of the Nomenclature of Territorial Units for Statistics (NUTS-3). Similarly to the OECD case, to measure economic development we used yearly volume changes in regional GDP, retrieved from the Statistics Netherlands database (CBS, 2023b). Voter turnout ratios are collected from the Electoral Council of the Netherlands, the Kiesraad. This entails data on Municipality, Parliamentary, and Provincial elections. The data for both variables, GDP growth and voter turnout ratios, are collected for the period 1998-2021. See Appendix A (Table A2) for the list of regions considered in the analysis. Similar to the OECD sample, GDP growth and voter turnout ratios suffer from heteroskedasticity. Therefore, we use heteroskedastic robust standard errors in the Granger causality test.

Survey data on trust in institutions is only available at the country level, which requires the use of an indirect measure of institutional trust on the regional level. Voter turnout rations at elections have been used as a proxy for trust in institutions in the literature. To find the strength of the relationship between voter turnout ratio and trust in institutions we need to make some data adjustments. Voter turnout ratios differ depending on the election type (Fiorino et al. 2017). As we are using turnout ratios from a variety of elections we standardise voter turnout ratios to ensure comparability across different election types and elections in different countries. Equation (1) represents the necessary calculation for each voter turnout value for each region or country, i, for each election type, m, at year t.

$$Standardised\ value_{i,m,t} = \frac{X_{i,m,t} - \mu_{i,m}}{\sigma_{i,m}} \qquad (1)$$

where $X_{i,m,t}$ is the voter turnout ratio in region or country i, for election type m, at time t, $\mu_{i,m}$ is the mean voting turnout ratio in region or country i for the election type m, and $\sigma_{i,m}$ is the standard deviation of the voting turnout ratios in the region or country I for the election type m. The values for the standardized voter turnout ratio can be interpreted as the number of standard deviations from the mean.

To determine the strength of the proxy variable we correlate the standarised voter turnout ratio with the trust in institutions variable. We find a correlation that is close to zero (0.006) using the OECD sample. This leads us to reject the standarised voter turnout ratios as an indirect measure of trust in institutions and raises questions on the differences between the found correlation and the argumentation in the literature. There are several possible explanations for the difference between our findings and findings established in the literature. According to Grönund and Setälä (2007) and Cox (2003), voter turnout ratios are found to be a decent proxy for institutional trust. Both studies rely on European data regarding voter turnout ratios for European Parliament elections. Based on this we identify two possible reasons underlying the disparity of our analysis to findings of Grönlund and Setälä, and Cox. Firstly, it could be that the results are not generalizable to the OECD sample, implying a different relationship between voter turnout and trust across different regions in the world. This explanation is further supported by Wang (2016a). The author does not find a significant correlation between institutional trust and voter turnout ratios in Asian countries using data from the Asian Barometer Survey (ABS). This can further be related to findings by Hooghe (2017) who finds that the effect of voter turnout ratios can impact levels of political trust differently depending on specific characteristics of electoral and party systems in a country. Secondly, a possible explanation for the differences in results is the variation in the correlation across different types of elections. Different from the mentioned papers, we use voter turnout ratios for a variety of election types. For each of these election types, citizens might have different motivations to vote leading to an overall low correlation between trust and voter turnout. Grönlund and Setälä (2007) argue that with distrust towards the parliament voting may not be regarded as a meaningful way to influence politics. Simultaneously, political distrust and increasing populism can result in anti-incumbent voting leading to higher voter turnout ratios (Hooghe, 2017). These opposing effects might be different across different election types. One could make the argument that, compared to national elections, elections for the European Parliament are less driven by anti-incumbent voting.

Based on the low correlation between trust in institutions and the standardized voter turnout ratio we therefore do not consider voter turnout as an indirect measure of trust in institutions. This does, however, not make the variable voter turnout irrelevant. Instead, voter turnout is a measure of political participation. High levels of political participation foster legitimacy, help to consolidate democratic institutions, and foster the political stability of the regime (Dalton, 2008; Norris, 1999). On the other hand, low levels of voter turnout decrease the representativeness of the political system, as it silences the voices of the non-voters in the political sphere (Kuzio, 2011). Furthermore, early studies use voter turnout ratios as proxies for the level of democracy in a country (e.g., Vanhanen, 1979). While Bollen (1990) acknowledges the role of democracy in determining voter turnout rates, he argues that many other factors also influence turnout ratios. Bollen concludes that voter turnout "may be a better measure of political participation" (p.14). Our correlation analysis does not establish voter turnout ratios to be a good proxy for trust in institutions. Instead, our empirical analysis regarding voter turnout should be seen as an analysis of the relationship between political participation and economic development.

6. Results and Discussion

To provide a preliminary understanding of the relationship between the variables under investigation, we conduct a correlation-based analysis. The purpose of this initial analysis is to gain insights into the strength and direction of the relationships among the variables. Table 6 presents the correlation analysis

Table 6: Correlation analysis

	Voter turnout	Trust in institutions
GDP	-0.342***	0.478***
GDP growth	0.124*	0.055
Trust in institutions	0.006	1

***p<0.01, **p<0.05, *p<0.1

Our correlation analysis finds that voter turnout is positively correlated with GDP growth. In other words, higher levels of political participation are on average associated with periods when the economies are experiencing high levels of growth. When considering political participation in elections as a measure of democracy, this finding is in line with Przeworski et al. (2000). The authors find that democracy and economic development tend to move together. Further, Stockemer and Carbonetti (2010) also find a positive link between democracy and economic development. The correlation between GDP per capita and voter turnout is negative and significant, indicating that higher GDP per capita coincides with lower voter turnout. It does, however, not imply a causal relationship between the two variables. The OECD finds that electoral participation has decreased over the last three decades (2019). Simultaneously we observe increasing levels of GDP per capita. These two developments explain the negative correlation between the two variables.

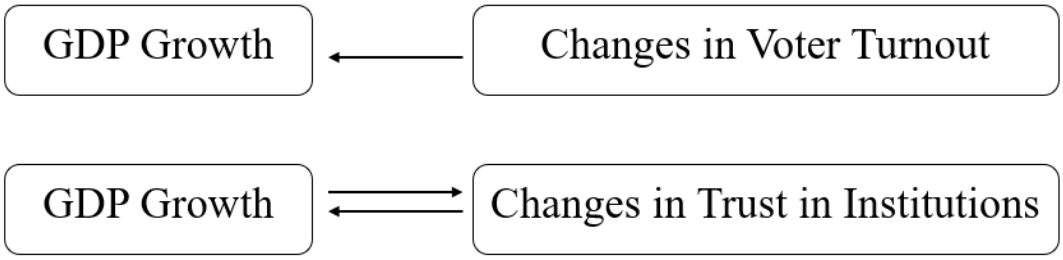
Additionally, and in line with the expectations and the literature, trust is strongly and positively correlated with GDP. There seems to be no correlation between trust in institutions and GDP growth. Further, as stated above, trust is not found to be related to voter turnout. This is in line with Hooghe (2017) who argues that political trust is closely related to various, partly opposing, electoral behaviours.

6.1 OECD Analysis

Our main analysis revolves around whether economic growth Granger causes trust in institutions on the OECD level and voter turnout on the Dutch regional level (see Appendix B and C). At the OECD level, we cannot conclude that GDP growth Granger causes changes in the voter turnout ratios at any common significance level. When analysing the reverse relationship, we conclude that changes in voter turnout ratios Granger cause GDP growth, at the 10% significance level. In other words, the causal link that runs from GDP growth to changes in voter turnout ratios is less significant than the reverse flow.

Further, we test if GDP growth Granger causes the trust in institutions variable. We conclude that the Granger causality test is significant in both directions, that is, institutional trust Granger causes GDP growth, and GDP growth Granger causes changes in institutional trust, at the 1% and 5% significance level, respectively. Figure 3 graphically indicates this causal flow between the variables of interest.

Figure 3: Graphical representation of Granger Causality in the OECD sample



Note. The arrows represent the causal flow, based on Granger causality, between the variables of interest.

Table 7 reports the coefficients concerning the Granger causality results. We find that changes in voter turnout negatively cause GDP growth. This implies that a past increase in the voter turnout rate is associated with a reduction in GDP growth in the future. Regarding trust and GDP growth, we find positive coefficients in both directions. This indicates that an increase in political trust increases GDP growth and that an increase in GDP growth increases political trust.

Table 7: OECD-level Granger causality results

Direction of the relationship	Granger causing	Long-run effect
GDP growth on changes in voter turnout	No	-0.087
Changes in voter turnout on GDP growth	Yes	-2.781*
GDP growth on changes in trust	Yes	1.281**
Changes in trust on GDP growth	Yes	0.412***

***p<0.01, **p<0.05, *p<0.1

Note. Long-run effect is measured as the sum of the estimated coefficients on lagged independent variables.

The findings in Table 7 are discussed individually. We find that GDP growth does not Granger cause changes in voter turnout ratios. Modernization theories (Inglehart, 1997) as well as classical sociological approaches (Wolfinger & Rosenstone, 1980) suggest that economic development should increase political engagement including voting in elections (Burns et al. 2001). Our findings on the OECD level imply that this is not the case. We do not find that GDP growth, a measure of economic development, Granger causes changes in voter turnout. Instead, our results are in line with the results found by Stockemer (2017). The author conducts a meta-analysis and finds that in the majority of studies (69%) economic development does not affect electoral turnout. Stockemer finds three predictor variables of voter turnout: mandatory voting, the importance of an election, and the size of the country the election takes place. A large number of other variables, including development and income inequalities are not found to predict voter turnout. The author concludes that the determinants of turnout are likely to be more complex as well as context-dependent.

Further, we find that positive changes in voter turnout ratios negatively Granger cause GDP growth. This finding is statistically significant at the 10 percent significance level. This finding implies that changes in voter turnout precede changes in GDP. This finding can be interpreted in multiple ways. A possible interpretation of this finding is that voters seem to anticipate a recession and participate more in elections. An alternative interpretation is that contested elections that attract a lot of voters imply political turmoil and hence lower growth. The causal mechanism and its economic interpretation regarding the effect of voter turnout on economic development need to be further researched to draw a definite conclusion.

Next, we turn to the empirical results regarding changes in trust in institutions and GDP growth. We find that GDP growth positively Granger causes changes in trust in institutions at the 5 percent significance level. This finding is in line with theoretical institutional theories of political trust (e.g., North, 1990) and adds to the empirical literature (e.g.: Van Erkel & Van der Meer, 2016; Kroknes et al., 2015) that establishes the relationship between economic growth and trust in institutions, however, fails to establish causality. Our finding imply that economic development causes changes in trust in institutions at the OECD level.

Finally, we find that changes in trust in institutions Granger cause GDP growth. This relationship

is positive and significant at the 1 percent confidence level. This implies that the relationship between GDP growth and changes in trust in institutions constitutes a positive feedback loop in which changes in both variables precede changes in the respective other variable. The relevance of changes in institutional trust in explaining changes in GDP growth is in line with the literature outlined above (e.g.: Hetherington, 1998; Citrin & Stoker, 2018). Trust in institutions influences economic development through indirect channels such as its effect on the quality of democracy and political institutions.

6.2 Regional Analysis Netherlands

Different from the analysis on the OECD level, the regional analysis is not conducted using the first difference of voter turnout. Instead, the regional analysis is performed with the voter turnout level. Table 8 presents the results of the Granger causality test. The analysis yields a significant Granger causality link between the two variables, voter turnout ratios and GDP growth that goes in both directions. This finding is significant at a 5% significance level for both tests. In other words, GDP growth precedes voter turnout and voter turnout precedes volume changes in GDP. Table 8 reports positive coefficients regarding the Granger causality test. Since they are both positive, it means that, at the Dutch regional level, past increases in GDP growth, precedes higher voter turnout ratios and that past high levels of voter participation in elections precedes positive economic growth. The long-run effect of voter turnout on GDP growth is substantially larger than the reverse effect. This means that periods of high electoral participation have a larger effect on economic growth than periods of high economic growth have on future electoral participation. The relationship between the two variables is graphically represented in Figure 4.

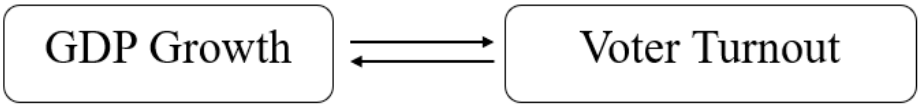
Table 8: Regional-level Granger causality results

Direction of the relationship	Granger causing	Long-run effect
GDP growth on voter turnout	Yes	0.146**
Voter turnout on GDP growth	Yes	1.892**

***p<0.01, **p<0.05, *p<0.1

Note. Long-run effect is measured as the sum of the estimated coefficients on lagged independent variables.

Figure 4: Graphical representation of Granger Causality in the regional sample



Note. The arrows represent the causal flow, based on Granger causality, between the variables.

In light of the literature regarding the causal link between economic development and participation in elections discussed above these results need to be reflected on. While theoretical approaches suggest a causal link between economic development and voter turnout (Inglehart, 1997; Wolfinger & Rosenstone, 1980), most empirical studies do not establish this causal link (Stockemer, 2017). Stockemer concludes that the determinants of turnout are likely to be more complex as well as context-dependent. Our analysis is conducted on the regional level of the Netherlands which implies a set of similar regions, offering a similar context that might explain the difference between our empirical results and the results by Stockemer. Based on our empirical results, one can conclusion that regional differences in political participation within the Netherlands can partly be explained by regional differences in economic development. To facilitate the convergence of political participation across Dutch regions, it is beneficial to ensure economic growth, especially in the economically weaker regions of the Netherlands.

7. Concluding Remarks

The purpose of this paper was to establish a causal relationship between economic growth and trust in institutions at the Dutch regional level. Due to the weakness of voter turnout ratios as an indirect measure of institutional trust, we do not establish this relationship at the regional level of the Netherlands. Instead, we find that economic growth positively Granger causes levels of political participation in terms of voter turnout ratios on the regional level. Furthermore, we establish that this relationship goes both ways, implying a feedback loop between economic growth and political participation on the Dutch regional level. In other words, the level of political participation in terms of voter turnout responds to fluctuations in economic growth, and vice versa, GDP growth responds to voter turnout ratios.

Using OECD data on institutional trust, we are able to investigate the causal effect between economic growth and trust in institutions. The Granger analysis reveals a positive feedback loop between GDP growth and change in institutional trust. This feedback loop implies that increasing economic growth precedes periods of increasing trust in institutions which in turn leads to increasing economic growth. Similarly, this loop can also imply decreasing trust in institutions in periods of economic downturn.

Furthermore, on the national level, we find that growth in voter turnout ratios negatively Granger causes GDP growth. This finding can be interpreted in multiple ways. A possible explanation is that voters anticipate periods of economic downturns which makes them more likely to vote. Alternatively, contested elections that attract a large amount of voters may imply political turmoil and hence lower growth. In order to understand the economic interpretation of the empirical findings regarding the relationship between economic growth and voter turnout growth rates, further research needs to be done.

Similarly, to understand the relationship between economic development and trust in institutions on the regional level, future researchers need to develop new methods to measure institutional trust as data is lacking on the regional level. Further, while GDP is a commonly used measure of economic development, one can question whether it is the best measure, and the most relevant measure regarding the regional analysis of the Netherlands. Instead, using concepts like the "brede welvaart" that capture the economic, ecological, and social welfare within a society might be more relevant for the government to draw policy implications (SER, 2021). Nonetheless, our analysis on the regional level suggests that differences in economic growth between the Dutch regions help to explain differences in voter turnout ratios. Our results suggest that ensuring economic growth in economically weak regions reduces the differences in political participation within the Netherlands.

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Appendix A - Tabulation of the regions and countries

Table A1: OECD sample and sample frequencies

Country	Voter Turnout	Trust in Government
Australia		16
Belgium		16
Canada		16
Chile		16
Colombia		16
Costa Rica		16
Denmark	18	16
Estonia		16
Finland	18	
France	18	16
Germany	18	16
Greece		16
Hungary		16
Ireland	18	
Israel		16
Italy		16
Japan		16
Korea	18	16
Lithuania		16
Mexico		16
Netherlands		16
New Zealand		16
Poland	18	16
Portugal	18	16
Spain	18	16
Sweden	18	16
United Kingdom	18	16
United States	18	16

Table A2: Dutch regions and election's frequencies

Region	Municipality	Parliament	Provincial	Total
Achterhoek	6	8	6	20
Agglomeratie 's-Gravenhage	6	8	6	20
Agglomeratie Haarlem	6	8	6	20
Agglomeratie Leiden en Bollenstreek	6	8	6	20
Arnhem/Nijmegen	6	8	6	20
Delft en Westland	6	8	6	20
Delfzijl en omgeving	6	8	6	20
Flevoland	6	8	6	20
Groot-Amsterdam	6	8	6	20
Groot-Rijnmond	6	8	6	20
Het Gooi en Vechtstreek	6	8	6	20
Ijmond	6	8	6	20
Kop van Noord-Holland	6	8	6	20
Midden-Limburg	6	8	6	20
Midden-Noord-Brabant	6	8	6	20
Noord-Drenthe	6	8	6	20
Noord-Friesland	6	8	6	20
Noord-Limburg	6	8	6	20
Noord-Overijssel	6	8	6	20
Noordoost-Noord-Brabant	6	8	6	20
Oost-Groningen	6	8	6	20
Oost-Zuid-Holland	6	8	6	20
Overig Groningen	6	8	6	20
Overig Zeeland	6	8	6	20
Twente	6	8	6	20
Utrecht	6	8	6	20
Veluwe	6	8	6	20
West-Noord-Brabant	6	8	6	20
Zaanstreek	6	8	6	20
Zeeuwsch-Vlaanderen	6	8	6	20
Zuid-Limburg	6	8	6	20
Zuidoost-Drenthe	6	8	6	20
Zuidoost-Friesland	6	8	6	20
Zuidoost-Noord-Brabant	6	8	6	20
Zuidoost-Zuid-Holland	6	8	6	20
Zuidwest-Drenthe	6	8	6	20
Zuidwest-Friesland	6	8	6	20
Zuidwest-Gelderland	6	8	6	20
Zuidwest-Overijssel	6	8	6	20

Appendix B - OECD Data analysis

Table B1: Correlation table between trust in government and voter turnout

Variables	(1)	(2)
(1) Trust	1.0	
(2) Voter turnout	0.006	1.0
	(0.947)	

Table B2: Correlation table between voter turnout ratio and changes in GDP

Variables	(1)	(2)
(1) Voter Turnout	1.0	
(2) Changes in GDP	0.124	1.0
	(0.069)	

Table B3: Correlation table between trust in government and changes in GDP

Variables	(1)	(2)
(1) Trust	1.0	
(2) Changes in GDP	0.055	1.0
	(0.262)	

Table B4: Correlation table between trust in government and GDP per Capita

Variables	(1)	(2)
(1) Trust	1.0	
(2) GDP per Capita	0.478	1.0
	(0.000)	

Table B3: Correlation table between Voter turnout and changes in GDP

Variables	(1)	(2)
(1) Voter Turnout	1.0	
(2) GDP per Capita	-0.342	1.0
	(0.000)	

Table B4: Hadri LM test for Trust in Government

H0: All panels are stationary
Number of panels = 26
Ha: Some panels contain unit roots
Number of periods = 16
Time trend: Not included
Asymptotics: T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance:(not used)

	Statistic	p-value
z	15.1943	0.0000

Table B5: Hadri LM test for Voter Turnout

H0: All panels are stationary
Number of panels = 12
Ha: Some panels contain unit roots
Number of periods = 18
Time trend: Not included
Asymptotics: T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance:(not used)

	Statistic	p-value
z	9.5589	0.0000

Table B6: Hadri LM test for changes in GDP (Trust sample)

H0: All panels are stationary
Number of panels = 26
Ha: Some panels contain unit roots
Number of periods = 16
Time trend: Not included
Asymptotics: T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance:(not used)

	Statistic	p-value
z	-1.7411	0.9592

Table B7: Hadri LM test for changes in GDP (Voter turnout sample)

H0: All panels are stationary
Number of panels = 12
Ha: Some panels contain unit roots
Number of periods = 18
Time trend: Not included
Asymptotics: T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance:(not used)

	Statistic	p-value
z	6.6064	0.0000

Table B8: Heteroskedasticity test for voter turnout

First-differenced voter turnout	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L	-.02	.027	-0.74	.461	-.073	.033	
Constant	-.044	.084	-0.52	.601	-.21	.122	
Mean dependent var		-0.044	SD dependent var			1.135	
R-squared		0.003	Number of obs			192	
F-test		0.545	Prob > F			0.883	
Akaike crit. (AIC)		594.712	Bayesian crit. (BIC)			601.227	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2(12) = 255.81

Prob>chi2 = 0.000

Table B9: Heteroskedasticity test for trust in government

First-differenced Trust	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L	-.038	.142	-0.27	.787	-.317	.24	
Constant	.168	.503	0.33	.738	-.82	1.157	
Mean dependent var		0.102	SD dependent var			8.449	
R-squared		0.000	Number of obs			390	
F-test		0.073	Prob > F			1.000	
Akaike crit. (AIC)		2768.662	Bayesian crit. (BIC)			2776.595	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2(12) = 98.53

Prob>chi2 = 0.000

Table B10: Heteroskedasticity test for changes in GDP Growth

First-differenced changes in GDP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L	-.026	.192	-0.13	.893	-.404	.352	
Constant	-.065	.215	-0.30	.762	-.49	.359	
Mean dependent var		-0.064	SD dependent var			2.892	
R-squared		0.000	Number of obs			192	
F-test		0.018	Prob > F			1.000	
Akaike crit. (AIC)		954.215	Bayesian crit. (BIC)			960.730	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2(12) = 32.92

Prob>chi2 = 0.0010

Table B11: Heteroskedasticity test for changes in GDP

Changes in GDP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L	.03	.019	1.61	.108	-.007	.068	
Constant	.569	.785	0.73	.469	-.974	2.113	
Mean dependent var		1.804	SD dependent var			3.473	
R-squared		0.007	Number of obs			390	
F-test		2.595	Prob > F			0.000	
Akaike crit. (AIC)		2023.179	Bayesian crit. (BIC)			2031.111	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2(12) = 560.62

Prob>chi2 = 0.000

Table B12: JKS non-causality test
H0: Changes in GDP does not Granger-cause first-differenced Trust.
H1: Changes in GDP does Granger-cause first-differenced Trust for at least one panelvar.
HPJ Wald test: 14.5500
p-value: 0.0125

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
Changes in GDP	1.281	1.427	0.900	0.369	-1.515	4.077

Table B13: JKS non-causality test
H0: first-differenced Trust does not Granger-cause changes in GDP.
H1: first-differenced Trust does Granger-cause changes in GDP for at least one panelvar.
HPJ Wald test: 81.3510
p-value: 0.0000

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
First-differenced Trust	0.412	0.346	1.190	0.233	-0.266	1.090

Table B14: JKS non-causality test
H0: first-differenced changes in GDP does not Granger-cause first-differences voter turnout.
H1: first-differenced changes in GDP does Granger-cause first-differenced voter turnout for at least one panelvar.
HPJ Wald test: 8.5224
p-value: 0.1297

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
First-differenced changes in GDP	-0.087	0.141	-0.620	0.537	-0.363	0.189

Table B15: JKS non-causality test
H0: first-differences voter turnout does not Granger-cause first-differenced changes in GDP.
H1: first-differences voter turnout does Granger-cause first-differenced changes in GDP for at least one panelvar.
HPJ Wald test: 10.6024
p-value: 0.0599

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
First-differenced voter turnout	-2.781	1.488	-1.870	0.062	-5.697	0.136

Appendix C - Regional Data analysis

Table C1: Hadri LM test for Voter turnout

Ho: All panels are stationary
Ha: Some panels contain unit roots
Number of panels = 39
Number of periods = 20
Time trend: Not included
Asymptotics: T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance: (not used)

	Statistic	p-value
z	0.7720	0.2201

Table C2: Hadri LM test for Changes in GDP

Ho: All panels are stationary
Ha: Some panels contain unit roots
Number of panels = 39
Number of periods = 20
Time trend: Not included
Asymptotics T, N -> Infinity sequentially
Heteroskedasticity: Not robust
LR variance: (not used)

	Statistic	p-value
z	0.9124	0.1808

Table C3: Heteroskedasticity test for voter turnout

Voter turnout	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig.
L	-.015	.012	-1.26	.208	-.038	.008	
Constant	-.056	.042	-1.32	.187	-.139	.027	
Mean dependent var		-0.082	SD dependent var			1.183	
R-squared		0.002	Number of obs			741	
F-test		1.587	Prob > F			0.014	
Akaike crit. (AIC)		2061.219	Bayesian crit. (BIC)			2070.435	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedastic.
In fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2 (39) = 943.53
Prob>chi2 = 0.000

Table C4: Heteroskedasticity test for changes in GDP

Changes in GDP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L	.078	.114	0.69	.493	-.146	.303	
Constant	1.798	.115	15.67	0	1.573	2.024	***
Mean dependent var		1.795	SD dependent var			3.170	
R-squared		0.001	Number of obs			741	
F-test		0.471	Prob > F			0.998	
Akaike crit. (AIC)		3752.899	Bayesian crit. (BIC)			3762.115	

*** *p<.01, ** p<.05, * p<.1*

Modified Wald test for groupwise heteroskedastic
In fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2 (39) = 835.23
Prob>chi2 = 0.000

Table C5: JKS non-causality test
H0: Changes in GDP does not Granger-cause Voter Turnout.
H1: Changes in GDP does Granger-cause first-differenced Trust for at least one panelvar.
HPJ Wald test: 67.0352
p-value: 0.0125

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
Changes in GDP	0.146	0.133	1.100	0.272	-0.115	0.407

Table C6: JKS non-causality test
H0: Voter turnout does not Granger-cause changes in GDP.
H1: Voter turnout does Granger-cause changes in GDP for at least one panelvar.
HPJ Wald test: 62.8620
p-value: 0.0000

	Coefficient	Std. err.	z	P>z	[95% conf.	Interval]
Voter turnout	1.892	0.718	2.630	0.008	0.484	3.299