

# THE CAUSAL RELATIONSHIP BETWEEN INSTITUTION AND TRADE. EVIDENCE FROM THE REPUBLIC OF MOLDOVA - THE EUROPEAN UNION

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## Abstract

*The current paper aims to analyse whether there is a causal relationship between institutions and trade between the Republic of Moldova and the European Union after the signing of the Association Agreement. On the one hand, the existing theory of institutionalism points out that better quality of institutions leads to a significant increase in trade, thus countries with the same level of institutions tend to trade more and also trade might produce institutional change. On the other hand, some scholars emphasise that institutions are hard to change, thus trade liberalisation is ideal and trade will produce institutional change. Based on mixed methods analyses of reports, data and survey this paper concludes that there is no causality between institutions and trade taking into account the relationship between the Republic of Moldova and the European Union. Notwithstanding, institutions are important and influence commercial flows. This research is relevant to the extent that the European Union wants to strengthen its strategy towards Eastern countries especially the Republic of Moldova.*

*Keywords:* institutions, trade, institutionalism, the Republic of Moldova, the European Union

## Introduction

In recent decades, many institutional economics theorists have argued that institutions have a decisive influence on a multitude of economic aspects, therefore being the most important while the focus should always be on developing and strengthening them. On the other hand, other recent studies suggest that the factors that can determine the quality of institutions are more important than institutional quality (Acemoglu and Robinson, 2006) because if institutions matter so much and everyone agrees with this assumption, then why don't societies simply change their institutional quality?! (Acemoglu, 2008). When it comes to good governance and

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international trade, in most cases, the literature analyses the impact of institutional quality on trade, considering institutions as an independent variable and trade as the dependent variable on institutions. A large number of studies have highlighted that institutions matter in international trade, as better institutions boost trade, thus countries with similar institutional levels tend to trade more. However, a few articles suggest that there may also be an inverse relationship between them, namely that trade may have a greater impact on institutional quality. Therefore, the link between institutions and trade represents an ongoing debate among economists and experts in the field. Although most studies agree that there is a significant correlation between the two variables, the same cannot be said about the evolution and direction of this relationship nor about who influences whom more or who has the primacy in this relationship. From this point of view, the signing of the AA (Association Agreement) between the Republic of Moldova and the EU (European Union) and the creation of a DCFTA (Deep and Comprehensive Free Trade Area) can help us better understand this relationship because the AA provides for the transfer of European institutions to domestic ones, while the DCFTA supports the liberalisation of trade by eliminating all barriers.

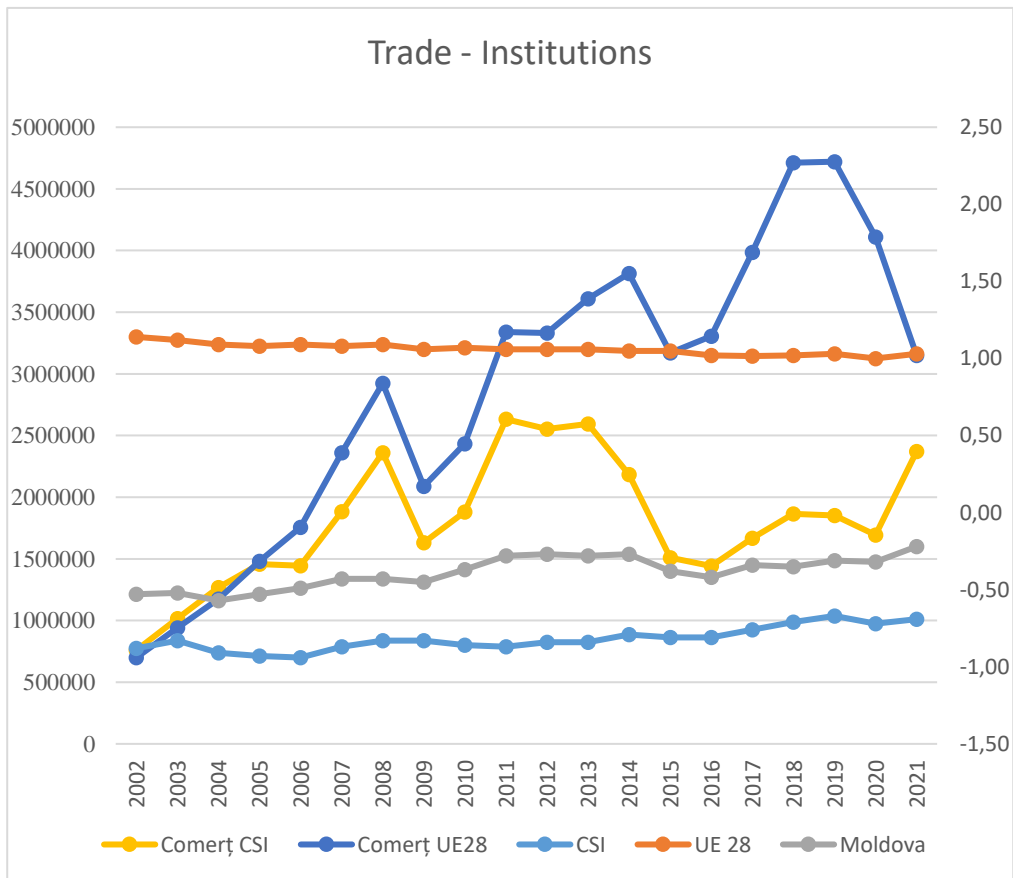
The initiation of ENP (European Neighbourhood Policy) led to an increase in trade flows with the EU states, while after the entry into force of the DCFTA, trade flows exploded. Moreover, the entry into force of the AA represented the first stage in the process of integration or ‘Europeanisation’ of the Republic of Moldova. The concept of Europeanisation understood as the adoption and implementation of EU rules in the transition countries was the most massive and largest transfer of rules in recent history (Schimmelfenning and Sedelmeier, 2005).

If a state wishes to become a full member of the EU, then the adoption of the EU institutional development model is a prerequisite. These issues are better captured in figure below. It can be seen that in the 2002-2021 period the curve representing the institutional quality in the Republic of Moldova is relatively straight, as in 2002 it had a value of (-0.53) while in 2021 it was (-0.22), recording a slight improvement of only (+0.31). It should be noted that the same stable trend in institutional quality is also observed in the European Union and the CIS (Commonwealth of Independent States) countries. This confirms the hypothesis that institutions take time to improve.

Firstly, an upward trend in trade flows with EU countries can be observed, which may be largely due to the launch of the ENP but especially to the creation of the DCFTA. Trade flows started to show an upward trend after 2009 and following the launch of the ENP, and exploded after the entry into force of the DCFTA, i.e. 2016. At the same time, we can see that the peak of trade flows was recorded in 2019, a year that was marked by the Covid-19 Crisis, which significantly affected global trade. The Republic of Moldova as a relatively small country was strongly influenced by this crisis, a situation visible in the graph above, when trade flows reached the level of 2011 and 2014, being the fastest decline in trade flows with the

EU. However, trade flows have increased with CIS states, reaching the level of 2008, which can be explained by the massive imports from these countries during the pandemic period.

**Figure 1: Evolution of the institutional quality of the Republic of Moldova, the European Union, the Commonwealth of Independent States and trade flows between the Republic of Moldova - European Union and the Republic of Moldova - Commonwealth of Independent States.**



Source: Author’s representation based on World Governance Indicators and Statistical Data Bank of Moldova

Secondly, the unit value of trade has increased continuously especially after 2009, while the quality of institutions has remained relatively constant, although 2/3 of the rules laid down in the AA have been implemented in national legislation.

Starting from this background and considering this data, namely that trade flows with EU Member States and CIS countries have experienced significant variations while institutional quality has not experienced such dramatic variations as trade, the main purpose of this article is to *establish the causal relationship between institutions and trade*. Therefore, the research questions are the following:

Q1: Is there a causal relationship between institutions and trade in the European Union's relationship with the Republic of Moldova?

Q2: How does the new institutional framework in the Republic of Moldova influence trade flows?

The answers to these two questions will provide us with the necessary information to achieve the main purpose of the paper which involves analysing the dynamics in time and space (i.e. at the level of the countries with which Moldova trades). The remaining of the paper is structured as follows: The next part provides a review of the literature on institutionalist theory and the relationship between institutions and trade. The third part describes the methodology of the paper where I described and motivated the choice of institutions and trade, as well as the statistical analysis method. The following part will present the analysis and interpret the obtained results while in the last part I will draw conclusions from my research and identify areas for further discussion.

## **1. The relationship between institutions and trade in the literature**

If we are talking about international trade between countries, then the literature focuses more on the impact of institutions on trade. This approach has its roots in institutionalist economics theory, which highlights the role of institutions in economic development and hence the assumption that a good institutional framework also encourages trade. In classical economics, it is well known that trade is a win-win situation (Ricardo, 1817) and trade stimulates the building of better institutions (Anderson, 2018). The quality of institutions influences the value of trade, implicitly with positive externalities on welfare and economic growth as an effect of trade liberalisation. A country with a certain institutional development level may have a higher or lower level of societal acceptance of reforms regarding trade with other countries. Precisely because some entrepreneurs may suffer short- or long-term losses. Thus, those who stand to lose from trade liberalisation will be strongly opposed to trade reform, moreover, they will mobilise an anti-trade policy-reform campaign. How and to what extent institutions deal with this situation may affect public opinion on trade liberalisation. The problems that exporters face have remained the same, yet the way they are addressed has changed over time. At the same time, it should be noted that institutions need to be adapted to the individual time, place and environment context. Institutions that are effective in one place at one time may have the opposite effect in a different environment. Institutional change occurs gradually over time, not immediately.

The literature discussing the effect of institutions on trade is not extensive enough, but the existing research is a good starting point. The prevailing assumption in the literature is that institutions matter, they are important, and countries with the same institutional quality tend to increase their trade flows. The first scholars concerned with the relationship between institutions and trade (Knack and Keefer, 1995) have concluded that the institutions that have the greatest impact on trade in a positive sense are: private property and contract enforcement.

The study of Linders, Slangen, de Groot, and Beugelsdijk (2005) applied to 92 countries over the 1999-2000 period argues that higher institutional quality increases trade flows for both importing and exporting countries (*ibid.*). Subramanian, Linders, Rietveld and De Groot (2003) using the gravity model calculated whether the quality of institutions and their homogeneity have an independent effect on trade. They found that states with the same institutional framework can increase their trade flows by an average of 13%, and the correlation between institutions and trade is validated and highly significant. Another important finding of the study is the argument that states with inefficient formal institutions are avoided by states with efficient institutions due to insecurity, uncertainty and especially very high transaction costs. For this reason, the states with inefficient institutions tend to trade with states with the same level of institutions, forgoing the benefits that more developed states would have brought. Moreover, if we look at exports and imports separately, then an increase in institutional quality can even lead to an increase in trade flows of 30 - 44%. (H. L. Groot *et al.*, 2003). An important contribution to the literature in this field is made by Dollar and Kraay (2003), their study being based on three main hypotheses. One of them points out that countries with better quality institutions and trading countries tend to develop better and faster, hence countries with better institutions also tend to have higher trade flows. There is therefore a very strong correlation between economic growth and development, high trade flows and institutions.

Jansen and Nordas (2004) found that a high quality institutional framework has a significant positive effect especially on the trade openness indicator. National tariffs on productivity are not statistically significant but combined with low quality institutions have a major impact on trade flows. Other authors consider that international institutions have a much stronger impact on trade flows because they force all actors to abide by the same rules and moreover, a larger number of actors force more simplified rules that are more qualitative and more accessible. One study concludes that institutions influence trade, but the intensity is given by context (Ojega *et al.*, 2014).

Other studies that have examined the relationship between institutions and trade have gone further and after demonstrating the positive link between trade and institutions have concluded that one of the institutions that mostly overshadows trade is very high corruption (Zelekha and Sharabi, 2012). Moreover, the analyses by Alvarez *et al.* (2017) underline that in addition to the fact that institutions are relevant

in bilateral trade, over time countries tend to trade with those countries that have the same institutional quality and not necessarily with those countries that have the highest quality of institutions, of course excluding other factors that influence trade such as infrastructure, distance, culture, language, diplomatic conflicts and so on.

An analysis conducted on the Eastern Partnership countries shows clear evidence of the trade benefits that these countries gained especially following the signing of the Association Agreement while the improvement of the institutional framework (the analysed institutions were democracy and corruption) in these countries have played an important role in promoting trade (Gylfason, Martinez-Zarzoso and Wijkman, 2015). On the other hand, there are also articles (much fewer) that demonstrate the impact of trade on institutions. Bhattacharyya (2011) through an econometric model concluded that trade liberalisation and growth positively influence private property rights in particular, as a change in institutional quality by 0.5% points determines a change in private property by 2.2% points.

The effect of trade on economic institutions, in particular, is significant, especially on reducing the persistence of extractive institutions. However, trade, as an instrument, is not powerful enough to fundamentally change the quality of institutions in the long-run. Therefore, in order to improve the overall institutional quality it is necessary to increase the quality of both economic and political institutions (Khalid, 2016).

Other articles demonstrate that trade flows can even lead to lower quality institutions, and this happens when firms that export or import have links to the political environment and so they are exempted from certain taxes or are advantaged through various kinds of usually non-transparent incentives (Hochman, Tabakis and Zilberman, 2012). This is also stipulated by Levchenko and Do (2005) as trade liberalisation can worsen institutional quality especially when the political power of a small group of politicians that control large exporting firms increases thereby having an interest in maintaining the status quo.

Generally speaking, good institutions such as contract enforcement or private property (Rule of Law and Regulatory Quality) boost trade, while bad institutions such as Control of Corruption significantly reduce trade. At the same time increasing trade flows through trade liberalisation can influence institutional quality. Much of the literature in this area explores this one-way relationship, with institutions either affecting trade or vice versa.

However, some (very few) recent studies show that the relationship between institutions and trade can be bidirectional, institutions influence trade but trade can also influence institutions. In a study of 197 countries between 1976 and 2004 (Nicolini and Paccagnini, 2011) concluded that there is a two-way causal relationship between institutions and trade, with both institutions influencing trade and trade influencing institutions. The causal relationship implies mutual influence, otherwise we only have a one-way relationship and on the long term, according to the Global Trade Report, there is a complementarity, the relationship is dual or co-

evolutionary (World-Trade-Organization, 2013). Therefore, the following types of relationship between institutions and trade result:

- Either there is a bidirectional causality relationship when both variables influence each other over time, or there is no causality.
- Either there is a one-way relationship:
  - when only institutions influence trade flows, trade flows do not influence the quality of institutions.
  - when trade flows influence the quality of institutions but the quality of institutions does not influence trade.

Knowing these aspects is important to better understand future trade flows as they can be useful for decision makers in formulating trade policies especially for the European Eastern Neighbourhood Policy because after their independence, the Eastern Partnership countries have been in an institutional vacuum for a long time. Therefore, building a high quality institutional framework, at least at the average of the EU countries takes time. Moreover, the EU has overestimated the capacity and readiness of the Eastern Neighbourhood states in terms of their willingness to undertake institutional reforms, but not so in terms of trade flows.

## **2. Quantifying institutions and trade flows - methodological approach**

Institutions do not have a clear and precise definition, they represent rules of the game and it is almost impossible to give a clear definition, hence the difficulty to „quantify” them precisely<sup>1</sup>. There are many kinds of institutions and, above all, many different methodologies for „measuring and quantifying institutions”. It is impossible to choose and analyse all the existing institutions, however in order to encompass as broad a spectrum of the institutional framework as possible I have chosen to use the database entitled Worldwide Governance Indicators formulated by Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi. In the methodology used by these theorists, governance is defined as a series of institutions through which the state exercises its authority. This includes (a) the process by which a government is elected, monitored and replaced; (b) the capacity of government to formulate and implement policies; and (c) the respect that citizens and the state have for the institutions that govern economic and social interactions (Kaufmann, Kraay and Mastruzzi, 2010). This results in a set of institutions comprising six indicators namely:

- (a) The process by which a government is elected, monitored and replaced;
  - 1) Voice and Accountability - addresses the extent to which citizens of a state have the opportunity to participate in choosing the government, as well as

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<sup>1</sup> For this reason, the terms measuring and quantification will appear with quotation marks.

freedom of expression, freedom of association or freedom of the press and human rights.

- 2) Political Stability and Absence of Violence/Terrorism - measures the likelihood of a government being destabilised or overthrown by violent or unconstitutional means (including politically motivated violence or acts of terrorism).
- (b) Government capacity to formulate and implement policies:
- 3) Government Effectiveness - measures the quality of public services, the quality of the civil service and its independence in the face of political pressures, and the quality of public policy formulation and implementation or the credibility of the government's commitment to those policies. This indicator also covers the level of bureaucracy, in other words the ability of the government to formulate and implement good policies, in this case the ability of the government to implement the EU *acquis communautaire* into national law.
  - 4) Regulatory Quality - measures the government's ability to formulate and implement viable policies and regulations that enable and promote private sector development. The ability to ensure fair competition, to facilitate the opening of new business and to deregulate policies that inhibit the free market mechanism as well as over-regulating foreign trade and business.
- (c) The respect that citizens and the state have for the institutions that govern economic and social interactions;
- 5) Rule of Law - refers to the quality and independence of the legal system; it concerns perceptions of the extent to which state agents respect the norms of society, particularly in terms of the quality of contract enforcement, property rights, police and courts, and the likelihood of crime and violence.
  - 6) Control of Corruption - represents the absence of law, unfair behaviour in public-private relations. It targets indicators on the quality of regulation, the rule of law, with reference to the impact of bad governance on the economy. Corruption as regulation of intrusion, involvement of a third actor usually the state, leading to increased transaction costs. Selective justice tracks perceptions of the extent to which public power is exercised for personal gain (both minor and grand corruption) as well as the 'capture' of the state by elites and private interests.

Firstly, these indicators were chosen because their methodology combines 31 different sources of data collection both nationally and internationally for more than 200 countries since 1996. The six institutional indicators are aggregated indicators, each with a numerical value ranging from (-2.5) representing the lowest value with the worst institutional quality, to (+2.5) the positive value associated with the best institutional quality. These indicators have become increasingly used in recent years by both policy makers and researchers in the field. Their utility comes from the fact that they provide a broader coverage of the governance process in a country, broader



than any other existing database because other databases focus on the analysis of only one institution or process. Secondly, the richness of the sources of information is another strength of these indicators, simply because it reduces errors as much as possible, so that the average of the 31 sources represents the value closest to reality. Thirdly, the methodology used to calculate these indicators allows the margin error to be as small as possible (Kaufmann, Kraay and Mastruzzi, 2007).

Therefore, the quality of institutional indicators matters for improved economic outcomes, this being the conclusion reached by the authors (Kraay, Kaufmann and Zoido-Lobaton, 1999). In addition to the fact that these indicators cover a wide range of institutions, they have been used in numerous studies, in various reports of the World Bank (Dollar and Kraay, 2002; Jansen and Nordås, 2004) or the International Monetary Fund and by many experts (Alvarez *et al.*, 2017; Bergh *et al.*, 2014; H. L. Groot *et al.*, 2003; Gylfason *et al.*, 2015; Linders *et al.*, 2005; Mauro, 1995; Rietveld *et al.*, 2005; Slangen *et al.*, 2005; Subramanian *et al.*, 2004; Zelekha and Sharabi, 2010).

For these reasons listed above I have chosen to use these institutional indicators to analyse the evolution and quality of institutions in the Republic of Moldova. The EaP was signed in 2009 and the first political effect was the signing and entry into force of the AA, therefore the analysis of institutional quality received more attention during 2010-2021. However, in order to be able to compare the evolution and quality of institutions I will start the analysis of the institutional framework in 2002. Thus, the period analysed is 2002-2021.

The analysis also included the average institutional quality of the CIS countries as well as the average institutional quality of the European Union countries in order to compare the institutional quality of the Republic of Moldova with other countries. The CIS countries<sup>2</sup> were also included in the analysis due to the fact that the Republic of Moldova was part of the USSR (Union of Soviet Socialist Republics) and is currently part of the CIS, thus having established trade links that are still maintained today, even though the Republic of Moldova has also signed an AA, and aspires to membership of the European Union. This will allow a comparative analysis of the quality of the institutional framework between the two blocs.

A total of 39 countries are analysed (including the UK). Therefore, the present analysis starts from the next level of implementation of the Association Agreement in the legislation of the Republic of Moldova (the NAPAA) which is of about 72-75% (MFAEI, 2020). The implementation of the AA is declared a national priority, also taking into account the fact that the Republic of Moldova officially applied for EU membership on 4th of March 2022. This fact aligns very well with Crespy's

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<sup>2</sup> CIS - Commonwealth of Independent States, currently consists of 10 members, all former Soviet republics except the Baltic States and Georgia and Ukraine. However, Ukraine has been included in the analysis in several respects. Firstly because it is Moldova's neighbour and this makes Ukraine an important trading partner for Moldova. Secondly Ukraine left the CIS recently (2015) after the conflict in Crimea.

statement that over time the reproduction/transposition of institutions considered to be models of governance have either been a success for the state that implemented them or have ended in failure. (Crespy, 2011).

Trade flows will be analysed in terms of total value (Export + Import) measured in thousands of dollars (USD) with EU and CIS countries, covering the same time period 2002-2021. Data was collected from: National Bureau of Statistics of the Republic of Moldova, National Bank of the Republic of Moldova, World Integrated Trade Solutions, UN Comtrade, Trading Economics, World Trade Organization, International Monetary Fund, European Trade Union Institute, Chamber of Commerce and Industry of the Republic of Moldova, International Trade Center.

Once the method for collecting and processing data on institutions and trade flows was set out, the next steps implied establishing the causal relationship between these two variables and testing the influence of institutions on trade. In order to analyse the causal relationship between institutions and trade and then the influence of institutions on trade, I used the following empirical strategy. First, considering the reserach objective and taking into account the specificity of the data used (time-series and panel data), I used the following steps:

- (1) Checking the stationarity of the data series and transforming them, where necessary;
- (2) Two-way causality testing of panel data series using the Dumitrescu Hurlin Test;
- (3) Estimation of panel regression models with fixed effects but also with random effects;
- (4) Identification and validation of the appropriate model or models for the data used.

To validate the results we used robustness tests (through random effects model estimation results) and the variables chosen for testing were: GDP growth (%) and Inflation rate (%) data collected from the World Bank, International Monetary Fund website.

## **4. Results and findings**

### **4.1 Testing the stationarity of data series**

An essential step in the process of econometric modelling of panel data is to check the stationarity of the data series. In the literature, a distinction is made between tests that allow the determination of the order of integration of the variables for each series in the panel and those tests that check the order of integration of the variables considering the whole panel. The first category of tests is based on the construction of an Augmented Dickey-Fuller (ADF) regression for each series in the panel and tests the null hypothesis that there is an unit root for each individual series in the panel (the series is non-stationary) against the alternative hypothesis that the series is stationary. The second category of tests are based on the ADF model, but

the tested null hypothesis states that each data series in the panel admits the same unit root (the series is non-stationary) and is tested against the alternative hypothesis that the series is stationary. Considering the particularity of the panel data used, we consider that the unit root tests that can be used are those proposed and developed by Im, Pesaran and Shin (IPS, 2003), Choi (Fisher-ADF, 2001), which fall into the first category of tests, and the one developed by Levin, Lin and Chu (LLC, 2002), which is included in the second category mentioned above.

**Table 1. Stationarity testing**

| Variable        | Undifferentiated |             |             |
|-----------------|------------------|-------------|-------------|
|                 | LLC              | IPS         | Fisher-ADF  |
| Log Trade       | -5,5561 ***      | -4,1130 *** | 128,427 *** |
| GDP growth rate | -9,7369 ***      | -4,4179 *** | 133,483 *** |
| Inflation rate  | -8,2161 ***      | -4,3461 *** | 128,078 *** |

*Notes:* \*\*\* indicates a significant test for a 1% risk; \*\* indicates a significant test for a 5% risk; \* indicates a significant test for a 10% risk

LLC - the test proposed by Levin, Lin and Chu

IPS- the test proposed by Im, Persan and Shin

Fisher ADF - the test proposed by Choi Augmented Dickey-Fuler

*Source:* Author's calculations

The first two tests are used because they do not impose the restriction of a balanced panel, but mainly because they allow the inclusion of an autoregressive parameter corresponding to each country in the sample. The last test is selected because of a relatively small sample, which is inherent when analysing a phenomenon at country level and for a relatively short period of time.

As shown in Table 1, the test results are significant regardless of the test used and for all three variables analysed. Therefore, the series no longer need to be transformed using the difference operator, as they are all stationary. Furthermore, the period under analysis did not register large fluctuations, the time series for both institutional indicators and trade flows are constant and do not show very large deviations, even the fluctuations produced in 2009 cannot be considered statistically non-stationary.

## 4.2 Bidirectional causality testing of data series

A first goal of this approach is to determine the causality between institutions and trade, and in order to achieve this we have turned to the Granger causality test. This methodology is considered to be the most appropriate when aiming to establish the relationship between two variables (Hood, Kidd and Morris, 2008). Moreover, establishing causality between these variables is mandatory in order to draw concrete conclusions about the importance of institutions on trade flows or vice versa. As this

paper analyses variables with a complex character, usually the relationship is one of co-evolution, of mutual influence and most studies accept and promote this hypothesis. This leads to two scenarios, either institutions influence trade or trade influences institutions. However, due to the heterogeneity of institutions particular to each country and considering the specificity and importance of informal institutions, there is also a third scenario. This is less frequently encountered and implies the lack of a causal relationship between institutions and trade, resulting from the impossibility of a correlation between the two variables given the specificity of the data at the time for that country.

There are two aspects when considering the relationship between institutions and trade. The first aspect is related to the causal relationship, a cause-effect relationship. This aims to find out whether a variable  $x_t$  causes the variable  $y_t$  to change. This procedure is crucial to highlight how much of the value of the variable  $y_t$  can be explained by its earlier values and also to show whether lagged values of the variable  $x$  can improve the value of the variable  $y$ . In this way, causality results if the  $x_t$  variable helps to predict the value of the  $y_t$  variable or if the earlier values (lag1 (t-1)), (lag2 (t-2) of the  $x$  variable are statistically significant for the value of the  $y$  variable.

Thus, I aim to find out if there is causality between institutions and trade. It was previously mentioned that the most widely used causality test is the Granger Test, but the Granger Causality Test, considers the panel as a regular time series, assuming that all coefficients are the same for all countries. For this reason we used the test proposed by Dumitrescu-Hurlin (which is based on the Granger Causality Test) only that the Dumitrescu-Hurlin Test allows all coefficients to differ by country. In other words, this test is still based on the classical Granger causality method, but applied separately for each country.

This methodology makes it possible to determine how much of the current value of trade is explained by its past values, and whether each institution's past values at the country level improve the quality of the model. Therefore, the null hypothesis that trade is not caused (Granger) by institutions or, equivalently, that the coefficients corresponding to institution-specific lags are not statistically significant is tested.

**Table 2. Two-way causality testing**

| Null Hypothesis  | Dumitrescu Hurlin Test |                    |                    |                    |
|--|------------------------|--------------------|--------------------|--------------------|
|  | Lag 1                  | Lag 2              | Lag 3              | Lag 4              |
| (Log)Trade causes Participation and responsibility/liability | 0,4060<br>(0,5242)     | 0,9161<br>(0,4006) | 5,0385<br>(0,1913) | 7,6576<br>(0,6243) |
| Participation and responsibility/liability causes (Log)Trade | 0,7669<br>(0,1903)     | 1,8342<br>(0,2196) | 4,1124<br>(0,8875) | 8,3233<br>(0,4129) |
| (Log)Trade Causes Political Stability                        | 1,4055<br>(0,4338)     | 2,1174<br>(0,1212) | 1,1333<br>(0,3349) | 1,5398<br>(0,1893) |

|   |                    |                    |                    |                    |
|---|--------------------|--------------------|--------------------|--------------------|
| Political stability causes (Log)Trade   | 0,9700<br>(0,3250) | 0,2701<br>(0,7633) | 0,3028<br>(0,8212) | 0,5685<br>(0,6856) |
| (Log)Trade Causes Healing Effectiveness | 0,0518<br>(0,8199) | 3,0784<br>(0,2022) | 3,8088<br>(0,8099) | 7,5051<br>(0,6786) |
| Government efficiency causes (Log)Trade | 1,0481<br>(0,6977) | 2,3729<br>(0,8856) | 4,2357<br>(0,7659) | 7,3397<br>(0,7394) |
| (Log)Trade causes Quality of regulation | 1,5918<br>(0,1635) | 2,8588<br>(0,4045) | 3,0950<br>(0,8717) | 8,7875<br>(0,2945) |
| Quality of regulation causes (Log)Trade | 1,4821<br>(0,3013) | 2,4242<br>(0,9676) | 4,9222<br>(0,2459) | 5,8657<br>(0,6922) |
| (Log)Trade Causes Rule of Law           | 0,9622<br>(0,3826) | 1,8101<br>(0,0350) | 2,9832<br>(0,2784) | 4,2436<br>(0,7591) |
| Rule of law causes (Log)Trade           | 1,0322<br>(0,6595) | 2,2290<br>(0,6647) | 5,3562<br>(0,0879) | 6,8319<br>(0,9349) |
| (Log)Trade Causes Corruption Control    | 0,1548<br>(0,6941) | 1,5723<br>(0,2084) | 0,5177<br>(0,6702) | 0,7837<br>(0,5296) |
| Corruption control causes (Log)Trade    | 0,9328<br>(0,4435) | 2,5339<br>(0,8572) | 4,2702<br>(0,7338) | 6,7599<br>(0,9632) |

*Note:* (1) The level of significance of the statistical test appears in parentheses.

*Source:* Author's calculations

At the same time, the same test is also valid vice versa, meaning that the null hypothesis according to which each institution is not causally (Granger) driven by trade is tested. Thus, it is not significantly explained by prior values or different lags of trade at the individual country level. Given the results presented in the table below, it can be stated that, regardless of the institution considered, there is no bidirectional causal relationship between trade and institutions. Therefore, the analysis continues with the classical estimation of the link between trade and each type of institution separately, using the two methods specific to panel data, without taking into account the impact of the time lag of the two variables. Instead, this relationship is controlled by EU membership, GDP growth rate and inflation rate. In other words, given the period analysed and the data used, there is no causal relationship between institutions and trade in the case of the Republic of Moldova. Out of the six institutions analysed, none cause or are caused by trade. This means that these two variables, institutions and trade flows, have developed separately and do not depend on each other. We mentioned above that two aspects need to be taken into account when analysing the institution-trade relationship. While the first referred to the causality relationship to determine which variable is independent and which variable is dependent, the second refers to the influence of institutions and not the causality of institutions. The influence of institutions on trade flows will be tested in the next sub-chapter. Returning to the results, two conclusions can be drawn. First, as suggested by data regarding the institutional indicators, the Republic of Moldova has not made

significant progress in improving institutional quality, with the average value of institutional quality remaining constant over the periods analysed, with very small fluctuations that are statistically insignificant. Secondly, the increase in trade flows especially with EU countries is largely due to the Free Trade Agreement through the creation of the DCFTA.

The elimination of all barriers, tariffs and quotas between the member states of the agreement have led to a boost in trade and also to a reorientation from the CIS market to the European market, because the establishment of the DCFTA is based on the removal of duties on the import and export of goods, in compliance with the provisions of the GATT Agreement and the World Trade Organisation. Thus, border barriers - tariffs and non-tariff barriers - are relatively low. Accordingly, more than 50 countries covered by Moldova's regional agreements provide preferential access to about 86% of Moldova's exports, and the most important of these agreements is the Deep and Comprehensive Free Trade Area with the EU. Under the DCFTA, tariffs on EU imports into Moldova should be totally eliminated in the next 4 years, in exchange for zero-tariff access to the EU market for all products except a few agricultural products. A *dummy* variable on EU membership status was also introduced in the analysis and the result obtained shows statistical significance in terms of increased trade flows.

### 4.3 Estimation of panel regression models

The fixed effects model takes into account that certain unobserved effects that can have an important impact on the dynamics of the analysed phenomenon, being correlated with the independent variables in the model. Thus, three model variants are distinguished:

1. The cross-section size-specific fixed effects model;
2. Time-specific fixed effects model;
3. The model with both types of fixed effects.

In this analysis, the latter model is considered because it aims to simultaneously address the problem of spatial heterogeneity by measuring the effect of certain unobserved country-specific factors that are constant over time and have a significant influence on trade, and to capture the changes in the phenomenon over time that are common to all countries.

The equation of this model is:

$$\ln Trade_{it} = \beta_0 + \beta' \ln X_{it} + \mu_i + \lambda_t + \varepsilon_{it},$$

- $\ln Trade$  is the logarithm of the independent variable;
- $X_{it}$  is the vector of independent variables included in the model;
- $\mu_i$  is the constant country-specific and  $X_{it}$ ;
- $\lambda_t$  indicates the time-observed effects of variables not included in the model;
- $\varepsilon_{it}$  is the zero mean error term and independent of  $X_{it}$  ;

If the components  $\mu_i$ ,  $\lambda_t$  and  $\varepsilon_{it}$  are random variables of zero mean and constant variance, independent of each other, including  $X_{it}$ , we consider the model with random effects. The estimation of the random effects model involves the use of the generalised least squares (GLS) method. In this model, country-specific and time-dimension effects are also included simultaneously. In the analysis, the two types of models are estimated, with fixed effects and random effects for both dimensions of variation in time and space (country-specific) for the relationship between trade and each institution. These results are summarised in Tables 3 and 4.

**Table 3. Fixed effects model estimation results**

| Variable                         | Model 1                 | Model 2                | Model 3                 | Model 4                 | Model 5                 | Model 6                 |
|----------------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Participation and responsibility | 0,5053<br>(0,1903) ***  |                        |                         |                         |                         |                         |
| Political stability              |                         | 0,1806<br>(0,0800) **  |                         |                         |                         |                         |
| Effectiveness of governance      |                         |                        | 0,4282<br>(0,1605) ***  |                         |                         |                         |
| Quality of regulation            |                         |                        |                         | 0,5061<br>(0,1844) ***  |                         |                         |
| Rule of Law                      |                         |                        |                         |                         | 0,4526<br>(0,1479) ***  |                         |
| Control of Corruption            |                         |                        |                         |                         |                         | 0,4059<br>(0,1361) ***  |
| EU membership                    | 1,4599<br>(0,2075) ***  | 1,6704<br>(0,3129) *** | 1,2423<br>(0,3292) ***  | 1,7091<br>(0,3674) ***  | 1,4352<br>(0,3591) ***  | 1,1021<br>(0,3165) ***  |
| GDP growth rate                  | 0,0915<br>(0,0413) *    | 0,1331<br>(0,0419) *** | 0,1272<br>(0,0443) ***  | 0,1078<br>(0,0393) ***  | 0,1272<br>(0,0469) ***  | 0,1258<br>(0,0452) ***  |
| Inflation rate                   | -0,0883<br>(0,0222) *** | -0,0438<br>(0,0419) :  | -0,0542<br>(0,0268) *   | -0,0749<br>(0,0227) *** | -0,0543<br>(0,0257) *** | -0,0555<br>(0,0257) *   |
| Constant                         | 9,7360<br>(0,4752) ***  | 9,4432<br>(0,2579) *** | 10,0111<br>(0,1071) *** | 9,8560<br>(0,5497) ***  | 10,3087<br>(0,1068) *** | 10,1411<br>(0,5063) *** |
| Fisher test                      | 162,4437 ***            | 162,2132 ***           | 162,7707 ***            | 161,2659 ***            | 167,2254 ***            | 164,0218 ***            |
| R-Squared                        | 0,6538 ***              | 0,5677 ***             | 0,6078 ***              | 0,6447 ***              | 0,6779 ***              | 0,6130 ***              |

Source: Author’s calculations

Fisher test results for all 6 models (Table 4) show that the fixed effects specific to both dimensions are statistically significant, suggesting that the impact of each individual institution and the other independent variables, EU membership, GDP growth rate and inflation rate, on trade are influenced by their variations over time and within countries.

#### 4.5. Validation of panel regression models

On the one hand, we check whether the introduction of fixed effects in the model is redundant or not by applying the Fisher test, constructed on the basis of the residual variance of the restricted model (pooled OLS) and the residual variance of the unrestricted model (with fixed effects). Therefore, if the null hypothesis is rejected, which imposes the restriction that both country-specific and time-specific fixed effects do not differ significantly, it can be said that the fixed effects model is appropriate for analysing the impact of institutions and other independent variables on the time and cross-country variation in trade. On the other hand, the validity of random effects is tested using the Hausman test, which involves comparing the estimators of the coefficients obtained by the fixed and random effects methods. For this, the null hypothesis that random effects are not correlated with the independent variables is tested against the alternative hypothesis that suggests that the differences between the coefficient estimators obtained by the two estimation methods are systematic, which means that random effects are correlated with the independent variables. Thus, the rejection of the null hypothesis indicates that the fixed effects model is a better fit than the random effects model.

At the same time, for any of the 6 random effects models (Table 4), the Hausman test values are large enough to reject the null hypothesis, considering a significance level of even 1%. It can therefore be argued that the fixed effects model is superior to the random effects model for capturing unobserved heterogeneity in the relationship between trade and each individual institution, controlled for EU membership, GDP growth rate and inflation rate. This conclusion is also supported by the determination ratio (R-Squared) for which much higher values are obtained for the fixed effects models (Table 3) compared to those obtained for the random effects models (Table 4).

Therefore, the results considered and discussed further in the analysis are those obtained from the estimation of fixed effects models. Analyzing the signs and significance of the regression coefficients in Table 4, it can be concluded that each individual institution has a significant direct impact on trade. The quality of the institutional framework matters, is important and significantly influences trade (Muşchei, 2019). Additionally, regardless of the institution, it is observed that the dynamics of trade over time and at the level of the countries analysed is significantly explained by the following factors. The EU membership status suggests a significant increase in the Republic of Moldova's trade with EU member countries compared to non-EU member countries.



**Table 4. Random effects model estimation results**

| Variables                        | Model 7               | Model 8               | Model 9               | Model 10              | Model 11              | Model 12              |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Participation and responsibility | 0,5139**<br>(0,1951)  |                       |                       |                       |                       |                       |
| Political stability              |                       | 0,1456*<br>(0,0688)   |                       |                       |                       |                       |
| Effectiveness of governance      |                       |                       | 0,4277**<br>(0,1411)  |                       |                       |                       |
| Quality of regulation            |                       |                       |                       | 0,3076*<br>(0,1573)   |                       |                       |
| Rule of Law                      |                       |                       |                       |                       | 0,4544***<br>(0,0563) |                       |
| Control of Corruption            |                       |                       |                       |                       |                       | 0,4119**<br>(0,1183)  |
| EU membership                    | 1,7644**<br>(0,5168)  | 1,4089*<br>(0,6389)   | 1,2763*<br>(0,5173)   | 1,2608*<br>(0,6069)   | 1,4473***<br>(0,2897) | 1,3972*<br>(0,6850)   |
| GDP growth rate                  | 0,0974**<br>(0,0289)  | 0,0900**<br>(0,0339)  | 0,1124**<br>(0,0367)  | 0,1022**<br>(0,0351)  | 0,1099**<br>(0,0342)  | 0,1069**<br>(0,0356)  |
| Inflation rate                   | -0,0693**<br>(0,0177) | -0,0700**<br>(0,0213) | -0,0661**<br>(1,0273) | -0,0741**<br>(0,0202) | 0,0599**<br>(0,0191)  | -0,0691**<br>(0,0192) |
| Constant                         | 8,8409**<br>(0,8551)  | 9,5013**<br>(0,6997)  | 9,3910**<br>(9,1413)  | 9,4888**<br>(1,0615)  | 9,2766**<br>(0,9591)  | 9,3380**<br>(0,9936)  |
| Hausman test                     | 222,9605**            | 224,5361**            | 224,7252**            | 222,1606**            | 230,8954**            | 226,4395**            |
| R-Squared                        | 0,2292**              | 0,2434**              | 0,2661**              | 0,2193**              | 0,4228**              | 0,3208**              |

Source: Author's calculations

The GDP growth rate, for which a positive effect is obtained, suggests that countries with a positive evolution of GDP growth rate over time attract an increase in trade, contrary to those with a decreasing GDP growth rate that implies a decrease in trade. The inflation rate, which has a negative effect, indicates that an increase in inflation rate will lead to a decrease in trade at the level of the countries analysed. At the same time, for the three control variables, the estimated values of the regression coefficients do not differ substantially from one model to another, regardless of the type of institution considered or the type of effects included, fixed or random (Tables 4 and 5). It can therefore be said that the results on the impact of EU membership and GDP growth rate and inflation rate on trade are robust to the estimation method used, but also to the relationship between trade and each type of institution.

## Conclusions

The relationship between institutions and trade is still a topic of interest for many researchers, most articles in the literature analysing institutions as an independent variable and for this reason the conclusion is often that institutions are important, matter and influence trade. However, for a better understanding of this relationship it is necessary to do the causality test, either the Granger Test or the

Dumitrescu-Hurlin Test depending on the proposed objective and the analysed state. Thus, establishing the type of the variables they will be analysed more appropriately. In this article I aimed to answer the following research questions: Is there causality between institutions and trade in the relationship between the European Union and the Republic of Moldova? How does the new institutional framework in the Republic of Moldova influence trade?

According to the proposed methodology, we have statistically demonstrated that in the relationship of the Republic of Moldova with EU and CIS member states, regardless of the institution considered, there is no two-way causal relationship between trade and institution. Thus, the hypothesis that the relationship between institutions and trade is a two-way relationship is invalidated. This means that these two variables, institutions and trade flows have developed separately and do not depend on each other and they do not influence each other. Instead, this relationship is controlled by EU membership, the GDP growth rate and the inflation rate. In other words, at this point in time, with this database used and the proposed methodology it can be concluded that there is no two-way relationship between institutions and trade in Moldova's relationship with its trading partners in both the EU and the CIS.

The statistical results obtained confirm and validate the existing data. On the one hand there is no qualitative change in the institutional indicators while on the other hand we have a significant increase in trade flows. This may be one of the reasons explaining the lack of causality between these two variables analysed, namely the robustness of the institutional environment.

To determine whether or not institutions matter in trade relationships we looked at institutional quality and trade flows taking institutions as an independent variable. The results of the estimation of the fixed effects model showed that all the analysed institutions matter, are important for trade and have a statistically significant influence, and the hypothesis according to which the Quality of institutions in the Republic of Moldova influences trade is confirmed. Furthermore, irrespective of the institution, it is observed that the dynamics of trade over time and at the level of the analysed countries is significantly explained by: the status of EU membership, which suggests a significant increase in trade of the Republic of Moldova with EU member countries compared to non-EU member countries.

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