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A LONG MEMORY MODEL FOR ECONOMIC DIPLOMACY IN CROATIA

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Abstract. Research background: In today's globalized world characterized by economic independence, which is a measurable component of the level of relations among countries, economic dependence started to affect the direction, content, and intensity of these relations. Thus, the economy has taken the central role of diplomatic activities, while the border between the traditional political and diplomatic activities has become less visible. **Purpose of the article:** However, to express a numerical value-added for the economy, it is necessary to define the econometric model for calculating the correlation above precisely. It is necessary to define the order of integration of a series of economic diplomacy and macroeconomic aggregates. The research will try to prove the paper's primary hypothesis, which states that a series of economic diplomacy and macroeconomic aggregates activity movements are fractionally integrated. **Methods:** This will be tested by standard stationarity I(0) and unit root I(1) tests and fractional integration tests. The following tests were used to create tests of fractional integration: Geweke Porter-Hudak (1983), Log Periodogram Regression test (GPH), and Moulines–Soulier (1999) Log Periodogram test (MS) Davidson and Sibbertsen (2009). through the program Time Series Modelling version 4.48. **Findings & Value added**: The stationarity I(0) and unit root I(1) tests, as well as the fractional integration tests, showed that the series of economic diplomacy movement are commonly fractionally integrated, by which this paper's hypothesis was proved, namely that the series of economic diplomacy and macroeconomic aggregates activity movements are fractionally integrated. Since the stationarity, I(0) and unit root I(1) tests, as well as the fractional integration tests showed that series are commonly fractionally integrated, along with the simultaneous use of the structural relation and fractionally integrated relation in further research which measure the effect of economic diplomacy on macroeconomic aggregates movement. Our study results show a positive link between economic diplomacy and the country's macroeconomic performances in the long run.

Keywords: economic diplomacy index; macroeconomic aggregates; economic value added; fractional integration; long memory

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JEL Classification: FO2; F47; F55; C14

1. Introduction

The goal of any country's economic diplomacy is to create "added" economic value, and it, ultimately and indirectly, the achievement of economic growth and the country's welfare (Stjepanović, Tomić and Škare,. 2017; Mazzanti, Mazzarano, Pronti and Quatrosi, 2020).

All is also true for Croatia. Therefore, this paper will try to set a framework on the example of the Croatian economic diplomacy to define the movement of a country's economic diplomacy value to macroeconomic aggregates. First, the framework for the definition of movement of a series of economic diplomacy variables and macroeconomic indicators will be set, and depending on the result, a recommendation will be given for the use of an econometric model type which would precisely determine the numerically expressed values by which economic diplomacy affects the movement of the macroeconomic indicator of a particular country (Clark and Lebo, 2003).

Coase (1998) claims that new institutional economics (NIE) is vital for the bearers of economic policies because institutions in the form of laws, political systems, culture, or the educational system of a country influence the height of the costs of exchange and consequently the success of an economy.

Hanke and Walters (2000) claim that economic freedom can stimulate investments and growth and that development will not fulfill its aims without it, while Powell (2003) claims that the critical institutional factor is the degree of economic freedom.

Yongjian, Ning, and Xiaofang (2005) think that it is necessary to run one's business in the simplest possible way, in a motivating environment that enables excellent institutional support for entrepreneurship development. Therefore, the link between industrial policy and institutions is of decisive importance, especially in a lack of success.

The threshold is the hypothesis that a series of economic diplomacy and macroeconomic aggregates activities are fractionally integrated. Economic diplomacy activities are determined through the investment variables, lists of implemented laws, ordinances, and other legal regulations linked to economic diplomacy from 1995 to 2018 as proxy variables for the activities of economic diplomacy in Croatia while regarding macroeconomic aggregates, they are determined through industrial production, export, foreign exchange movement, inflation, unemployment and labor costs. The aim is to prove or reject the set hypothesis stating that the series of economic diplomacy and macroeconomic aggregates activity movements are fractionally integrated.

To determine the fractional integration of series, the DIPL index variable (proxy variable for economic diplomacy) will be tested by standard stationarity I(0) and unit root I(1) testes, as well as fractional integration tests.

The paper is structured as follows. After we introduce the study's topic, we present a recent literature review on economic diplomacy's importance for growth. The research methodology and data we use in our study are explained in section three, with the study's empirical results presented in section four. Discussion section (five) compares our study results with similar findings based on this paper's empirical results. The conclusion section provides a summary of our study findings with directions for future research on economic diplomacy.

2. Literature review

Moers (2002) says that the protection of property rights, a healthy legal system, small and supporting country, and economic freedom represent the pillars of economic growth.

Berggren (2003) directs that institutions which protect economic freedom improve economic growth because they:

a) promote a high return through lower taxes, a healthy legal system, and the protection of property rights

b) enable the allocation of talents/resources where it generates the highest value

c) speed up the dynamics of the economy in which there is competition thanks to the small number of regulations

d) enables predictable and rational decision-making thanks to a low and stable inflation rate

e) promote capital investments where the return is highest.

It is shown that "the understanding of economic growth implies the understanding of neoclassical factors, but the complementary evolution of politics and laws which form the basis of economic forms producing growth" (Myrhman and Weingast, 1994).

According to Acemogleou (2004), the so-called growth models are still actual in economics, and although they have explained a lot in the growth mechanism, they still do not offer its fundamental explanation.

The currently leading hypothesis of the new theory of growth (inside NIE), which explains the differences in GDP determinants among countries, relates to the so-called social infrastructure, a concept under which Hall and Jones (1999) imply institutions and national policies which stimulate investments and production, not expenditure and seeking for rents, as is assumed by the neoclassical theory of growth (Godlewska and Morawska, 2019).

According to North (1991), "institutions give to economics the structures of incentives, and as this structure of incentives forms, it directs the economic change toward growth, stagnation or decline. "In the neoclassical theory, according to which the costs of using the market, or the transaction costs, are equal to zero, "the institution does not have" or does not need them – the only costs held by the acting parties are the transformation costs (resources to products and services). On the other hand, NIE claims that the transaction costs are inherent and significantly influence economic growth, economic decisions and success, types, direction, and organizations' structure occurring in society. Therefore, according to NIE, production, and exchange's total costs include transformation and transaction costs (North, 1990).

Pieper (2000) focuses on the research of the correlation between the economic structure and the institutional organization inside it, all of them together affecting the macroeconomic environment, so he concludes that a "poor" economic structure and weak institutions inside it will lead to a low rate of economic growth and its unsustainability.

Yongjian, Ning, and Xiaofang (2005) conclude that economy will grow if the existing institutions are useful, while the benefits of the industrial breakthrough can be achieved exclusively if the existing pre-industrialized conditions and the expected industrialization benefits are strong enough to prevail the existing obstacles and to enable the liberation of those powers significant for the industrial policy, and consequently economy as a whole.

The main issue that remains unsolved in NIE's theoretical research in the area of institution's impact on economic growth is how productive institutions appear, i.e., which variables are "explicitly" behind the influence of the institutional "infrastructure" on economic growth. The researchers and professional public's interest increases with the cognition that in the global socio-economic processes. The success of each observed subject of analysis (national economy, social group, international integration, company) depends on institutional adaptation and concepts such as institutions, institutional development, and institutional frameworks. Institutional adaptation, quality, and capacity of institutions are often mentioned in a different context. Innovation position in the institutional framework also plays an important role (Grossman and Helpman, 1991).

3. Research methodology

The first step in determining the fractionation of economic diplomacy and macroeconomic aggregates activity movements is the stationarity tests I (0) (the arithmetic mean, and the dispersion measures do not change in time). The unit root tests I(1) (the arithmetic mean and the dispersion measures change in time), as well as fractional integration tests, group, and individual, for series of macroeconomic aggregates and economic diplomacy movements to prove or reject the set hypothesis stating that the series of economic diplomacy and macroeconomic aggregates activity movements are fractionally integrated.

Macroeconomic aggregates we use in this study are:

- industrial production (iip),
- export (izvoz),
- foreign exchange movement (eur),
- inflation (cpi),
- unemployment (nez),
- labor costs (nad).

The economic diplomacy index (dipl - a proxy for economic diplomacy level) is constructed as an average index of the following economic diplomacy activities:

- investment variables,
- lists of implemented laws,
- ordinances,
- Furthermore, other legal regulations were linked to economic diplomacy from 1995 to 2018 in Croatia.

We use data from the Croatian statistical office (www.dzs.hr) and Eurostat (https://ec.europa.eu/eurostat/home?) and for the economic diplomacy index data from the Croatian national parliament (https://www.sabor.hr/en/home).

Through the Seasonal Adjustment Program – Time Series Modelling 4.48 for the creation of stationarity tests I(0), the following tests were used:

- Robinson-Lobato test is based on a periodogram suggested by Robinson and Lobato (1998), which represents a test against the alternative $d > 0$ with rejection in the upper part and a test against the alternative $d < 0$ with rejection in the lower part.
- KPSS test – to calculate the p-value of inequality, the tables are given in the work by Kwiatkowski et al. (1992) are used.
- V/S test – modified KPSS test, the p-values are calculated analytically by a modified formula given in Giraitis et al. (2003).
- Lo's modified R/S test is one of the Hurst's test versions for short-term memorization with the kernel HAC variance estimator's help while calculating the p-value of inequality tables given in the work by Lo (1991) is used.
- Harris-McCabe-Leybourne test or HML test is based on the long-term auto variance and is asymptotic N (0, 1) for the null hypothesis. Two settings have to be chosen, an abbreviated parameter c where k = (cT)1/2, and L where l = LT12/25 indicating the throughput of the variance parameter (Harris et al., 2008).

Through the Seasonal Adjustment Program – Time Series Modelling 4.48 for the creation of unit root tests I(1), the following tests were used:

- Augmented Dickey-Fuller Test or ADF test – the number of shifts for the ADF test is chosen from [0,…, 2T1/3] (Dickey and Fuller 1979, Said and Dickey 1984)
- Phillips-Perron test (Phillips and Perron 1988)
- Elliott-Rothenberg-Stock tests – to perform the calculation, the model tables given in Elliot et al. (1996) are used. The entries in those tables used to define the final sample size are linearly interpolated, ensuring the value which matches the real analyzed sample, and for this purpose, the subject "∞" is treated as an equivalent for 1,000 observations.
- Modified Dickey – Fueller test or DF-GLS test
- Pt test – feasible likelihood ratio test where a kernel of variance estimations is used to perform the calculation.

Through the Seasonal Adjustment Program – Time Series Modelling 4.48, the "normality" test Jacque-Bera (JB) is used to determine and establish the ratio of the minimal, maximal, median, standard deviation, asymmetry coefficient (skewness) and flattening (kurtosis):

$$B = \frac{T}{6}\left(\frac{Sk}{SD^3}\right)^2 + \frac{T}{24}\left(\frac{Kt-3SD^4}{SD^4}\right)^2 \quad (1)$$

where SD represents the standard deviation, Sk is asymmetry, and Kt is flattening.

The following tests were used to create tests of fractional integration: Geweke Porter-Hudak (1983), Log Periodogram Regression test (GPH), and Moulines–Soulier (1999) Log Periodogram test (MS) through the program Time Series Modelling version 4.48.

4. Results

Stationarity I(0) and unit root I(1) tests show that the group stationarity test (Table 1) for all time series rejects the null hypothesis about the existence of a unit root: Levin, Lin & Chu (2002) -2.93282; Im, Pesaran & Shin (2003) -10.4673, ADF – Fisher 230.134 (Dickey, D.A. and W.A. Fuller (1979), and PP – Fisher 397.056, (Maddala and Wu (1999) and Choi (2001), and Hadri (2000).

Table 1. Group stationarity test of variables

Panel test	Statistics	P-value
Levin, Lin and Chu	-2.93	0.00
Im, Pesaran and Shin	-10.47	0.00
Augmented Dickey-Fuller	230.1	0.00
Phillip – Perron	397.1	0.00

Source: Authors' analysis

5. Stationarity tests

What follows is the stationarity I(0) and unit root I(1) tests' results. These tests were created through the X-13ARIMA-SEATS Seasonal Adjustment Programa – Time series modeling 4.48 (time series deseasonalized). For the I(0) test, the null hypothesis was set – H_0 that the series is stationary, and for the I(1) test, the null hypothesis was set, stating that the series has a unit root (see Table 2).

Table 2. Stationarity test on the consumer price index

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-10.03	0.00
Augmented Dickey-Fuller	-10.01	0.00
Phillip – Perron	-13.48	0.00

Source: Authors' analysis

The parameter p (Robinson-Lobato) for the test I(0) is higher than 0.05 (0.336), which means that H_0 is accepted. It indicates that the series is stationary. The value of the parameter p for test I(1) is lower than 0.05 (0.01), which rejects the null hypothesis stating that the series has a unit root and accepts H_1 indicating that the series does not have a unit root. The value of Robinson's d test (0.115676) shows that the series inclines to fractional integration, determined later on in work through fractional integration tests (see Table 3).

Table 3. Stationarity test on the diplomacy series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-9.84	0.00
Augmented Dickey-Fuller	-10.08	0.00
Phillip – Perron	-14.7	0.00

Source: Authors' analysis

The p parameter value (Robinson-Lobato) for the stationarity test is lower than 0.05 (0.026), which means that the null hypothesis, claiming that the series is stationary, is rejected. The p parameter value for the unit root test is lower than 0.05 (0.01), which means that the null hypothesis, claiming that the series has a unit root, is rejected. The value of Robinson's d test (0.197209) indicates that the series inclines to fractional integration, determined later on in work through fractional integration tests (see Table 4).

Table 4. Stationarity test on the diplomacy series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-2.88	0.05
Augmented Dickey-Fuller	-2.51	0.09
Phillip – Perron	-1.87	0.09

Source: Authors' analysis

The (Robinson-Lobato) p parameter values for the test I(0) are higher than 0.05 (0.432), which means that the null hypothesis, claiming that the series is stationary, is accepted.

The p parameter value for test I(1) is higher than 0.05 (0.09), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.475678) indicates that the series inclines to fractional integration, determined later on in work through fractional integration tests (see Table 5).

Table 5. Stationarity test on the industrial production series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-1.95	0.05
Augmented Dickey-Fuller	-1.78	0.09
Phillip – Perron	-1.95	0.09

Source: Authors' analysis

The values of (Robinson-Lobato) the p parameter for the test I(0) is higher than 0.05 (0.208), which means that the series is stationary (H0). The p parameter value for test I(1) is higher than 0.05 (0.9), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.493626) indicates that the series inclines fractional integration, determined later on in work through fractional integration tests (see Table 6).

Table 6. Stationarity test on the export series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-1.35	0.10
Augmented Dickey-Fuller	-0.62	0.09
Phillip – Perron	-1.42	0.09

Source: Authors' analysis

The p parameter values (Robinson-Lobato) for the test I(0) are higher than 0.05 (0.133), which means that the H_0 hypothesis, indicating that the series is stationary, is accepted. The p parameter value for test I(1) is higher than 0.05 (0.9), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.486817) indicates that the series inclines fractional integration, determined later on in work through fractional integration tests (see Table 7).

Table 7. Stationarity test on the labour costs series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-1.81	0.01
Augmented Dickey-Fuller	-2.14	0.09
Phillip – Perron	-21.7	0.01

Source: Authors' analysis

Robinson-Lobato p parameter values for the test I(0) are lower than 0.05 (0), which means that the H_0 hypothesis is rejected, while the alternative hypothesis H1, indicating that the series is not stationary, is accepted. The p parameter value for test I(1) is higher than 0.05 (0.9), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.189195) indicates that the series inclines fractional integration, determined later through fractional integration tests (see Table 8).

Table 8. Stationarity test on the unemployment series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-2.07	0.10
Augmented Dickey-Fuller	-1.93	0.09
Phillip – Perron	-1.35	0.09

Source: Authors' analysis

The p parameter values for (Robinson-Lobato) the test I(0) are lower than 0.05 (0.28), which means that the H_0 hypothesis, indicating that the series is stationary, is accepted. The p parameter value for test I(1) is higher than 0.05 (0.9), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.489376) indicates that the series inclines fractional integration, determined later through fractional integration tests (see Table 9).

Table 9. Stationarity test on the vacancy series

Series test	Statistics	P-value
Eliot-Rothenberg-Stock	-2.44	0.10
Augmented Dickey-Fuller	-2.43	0.09
Phillip – Perron	-4.18	0.01

Source: Authors' analysis

The p parameter values for (Robinson-Lobato) the test I(0) are lower than 0.05 (0.28), which means that the H_0 hypothesis, indicating that the series is stationary, is accepted. The p parameter value for test I(1) is higher than 0.05 (0.9), which means that the null hypothesis, claiming that the series has a unit root, is accepted. The value of Robinson's d test (0.460394) indicates that the series inclines fractional integration, determined later through fractional integration tests.

Fractional integration tests

The test results (Robinson's d value) indicate a possible fractional integration of macroeconomic aggregates. What follows are the fractional integration tests for each of the series.

The Geweke Porter-Hudak (1983) Log Periodogram Regression test (GPH) and the Moulines-Soulier (1999) Log Periodogram test (MS) were used in the program Time Series Modelling version 4.8 (see Table 10).

Table 10. Fractional integration test inflation

Semiparametric Estimation for cpi_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.27427	0.21972	1.248	0.234

Source: Authors' analysis

The fractional integration GPH test for the series of consumer prices and economic diplomacy index has a p-value of 0.234 (higher than 0.05), which rejects the null hypothesis and accepts the alternative H_1 hypothesis, which shows that the series is not fractionally integrated (see Table 11).

Table 11. Fractional integration test diplomacy index

Semiparametric Estimation for dipl				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.1653	0.21972	0.752	0.046

Source: Authors' analysis

The fractional integration GPH test for the series of diplomacy has a p-value of 0.046, so the null hypothesis claims that the series is fractionally integrated and accepted (see Table 12).

Table 12. Fractional integration test for the currency exchange rate

Semiparametric Estimation for eur_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.8274	0.21972	3.766	0.002

Source: Authors' analysis

The fractional integration GPH test for the series of currency exchange rate movement and economic diplomacy has a p-value of 0.002 (lower than 0.05), so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 13).

Table 13. Fractional integration test for industrial production

Semiparametric Estimation for iip_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.99156	0.21972	4.513	0.001

Source: Authors' analysis

The fractional integration GPH test for industrial production and economic diplomacy has a p-value of 0.001, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 14).

Table 14. Fractional integration test for export

Semiparametric Estimation for izvoz_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.99589	0.21972	4.533	0.001

Source: Authors' analysis

The fractional integration GPH test for the series of export and economic diplomacy has a p-value of 0.001, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 15).

Table 15. Fractional integration test for labour expenses

Semiparametric Estimation for nad_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.48035	0.21972	2.186	0.048

Source: Authors' analysis

The fractional integration GPH test for the series of labor expenses and economic diplomacy has a p-value of 0.048, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 16).

Table 16. Fractional integration test for unemployment

Semiparametric Estimation for nez_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	1.15915	0.21972	5.276	0

Source: Authors' analysis

The fractional integration GPH test for the series of unemployment and economic diplomacy has a p-value of 0, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 17).

Table 17. Fractional integration test for vacancies

Semiparametric Estimation for slr_d11				
Geweke/Porter-Hudak				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.8629	0.21972	3.927	0.002

Source: Authors' analysis

The fractional integration GPH test for the vacancies and economic diplomacy series has a p-value of 0.002, so the null hypothesis, claiming that the series is fractionally integrated, is accepted.

The fractional integration GPH test for each series individually shows the highest fractional integration of industrial production, export, and economic diplomacy.

To determine the fractional integration of macroeconomic aggregates, their fractional integration will be tested by the Moulines – Soulier test (MS test) (see Table 18).

Table 18. The fractional integration test for the consumer prices index

Semiparametric Estimation for cpi_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.12696	0.07242	1.753	0.082

Source: Authors' analysis

The fractional integration MS test for the consumer prices index and economic diplomacy has a p-value of 0.082, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 19).

Table 19. The fractional integration test for economic diplomacy

Semiparametric Estimation for dipl				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.16544	0.07242	2.284	0.024

Source: Authors' analysis

The fractional integration MS test for the series of diplomacies has a p-value of 0.024, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 20).

Table 20. The fractional integration test for currency exchange rate

Semiparametric Estimation for eur_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	1.09415	0.07242	15.108	0

Source: Authors' analysis

The fractional integration MS test for the series of currency exchange rate movement and economic diplomacy has a p-value of 0, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 21).

Table 21. The fractional integration test for industrial production

Semiparametric Estimation for iip_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	1.13316	0.07242	15.647	0

Source: Authors' analysis

The fractional integration MS test for industrial production and economic diplomacy has a p-value of 0, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 22).

Table 22. The fractional integration test for labor expenses

Semiparametric Estimation for nad_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.1208	0.12466	0.969	0.335

Source: Authors' analysis

The fractional integration MS test for the series of labor expenses and economic diplomacy has a p-value of 0.335, so the null hypothesis is rejected, while the H_1 hypothesis, indicating that the series is not fractionally integrated, is accepted (see Table 23).

Table 23. The fractional integration test for unemployment

Semiparametric Estimation for nez_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	1.1022	0.07242	15.22	0

Source: Authors' analysis

The fractional integration MS test for the series of unemployment and economic diplomacy has a p-value of 0, so the null hypothesis, claiming that the series is fractionally integrated, is accepted (see Table 24).

Table 24. The fractional integration test for vacancies

Semiparametric Estimation for slr_d11				
Moulines/Soulier				
	Estimation	Std. Err	t-Ratio	p-Value
Fractional Parameter (d)	0.90161	0.12466	7.233	0

Source: Authors' analysis

The fractional integration MS test for the vacancies and economic diplomacy has a p-value of 0, so the null hypothesis, claiming that the series is fractionally integrated, is accepted. Both the MS and the GPH test of fractional integration show the fractional integration of the same series, especially for industrial production and export.

Discussion

We find a long-run relationship (positive) between economic diplomacy level and macroeconomic aggregates in Croatia. Our study results show that a higher level of economic diplomacy, implying higher efficiency and institutional presence in the macroeconomic environment, positively impacts the primary macroeconomic aggregates, both fiscal and financial. Economic diplomacy, in an institutional sense, is necessary but not sufficient condition for economic growth. Countries with higher public institutions' efficiency reach higher economic growth paths, resulting in increased economic competitiveness and trade integration.

Stationarity and long memory test we present in the study support the thesis of economic diplomacy and economic growth positive long-run relationships. Providing evidence of such a relationship is important not just for policymakers setting up long-run economic goals but also for practitioners and the real sector requiring highly developed and efficient economic diplomacy policy to compete internationally.

Our study results support the results we find in Peres et al. (2018), Jaworski and Czerwonka (2019), Buturac et al. (2019), finding a positive link between institutional quality and economic growth. As an inherent part of the institutional environment, economic diplomacy is an essential source of competitiveness, export growth, and advancement of the manufacturing sector driving economic growth forward. Finding a long-run relationship between economic diplomacy dynamics and macroeconomic aggregates in Croatia over 1995-2018 provide hard empirical evidence. Another significant result of our analysis is the nature of the relationship between economic diplomacy and macroeconomic aggregates. The relationship is a long run one, but also it is a fractionally integrated relationship. There is a long memory dynamic connecting economic diplomacy and macroeconomic aggregates in Croatia. Fractional integration we find in the study means economic diplomacy positively impacts the country's macroeconomic performance in the long run with no mean reversion. The meaning is that economic diplomacy exercises positive shock on macroeconomic aggregates and the effects of the shocks last forever; they are not dying out to the levels previous to the shock. Therefore, researchers' keen to explore the long-run relationship between economic diplomacy and the country's macroeconomic performance should use fractionally integrated models to provide the best research results.

Conclusions

The standard stationarity I(0) and unit root I(1) tests and the fractional integration tests were used to determining the fractional integration of a series of economic diplomacies and macroeconomic aggregates.

The stationarity I(0) and unit root I(1) tests, as well as the fractional integration tests, shows that the series of economic diplomacy movement are commonly fractionally integrated, by which this paper's hypothesis was proved, namely that the series of economic diplomacy and macroeconomic aggregates activity movements are fractionally integrated.

Moreover, the fractional integration tests showed that economic diplomacy series with industrial production variables and exports significantly impacted fractional integration.

Stationarity I(0) and unit root I(1) tests and the fractional integration tests showed that series are commonly fractionally integrated. Future research should use econometric models that belong to structural vector autoregressive fractionally integrated and movable averages. A sub-category inside this group of models is also the structural VARFIMA model, which was the most appropriate for analyzing the so-called economic series (Durr et al., 1997). Economic diplomacy data belong to this category, so they should be studied using the VARFIMA model in the future.

Our study results corroborate Borojo and Yushi (2020), Chi-Wei et al. (2019), finding a positive relationship between institutional quality and economic growth. Economic diplomacy is a critical factor of the institutional macroeconomic environment and essential economic growth drivers not sufficiently exploited and used in many developing economies.

Our study is a modest attempt further to research the importance of economic diplomacy for economic growth. Our study's limitation lies in the availability of the data (annual and not quarterly or monthly data), bias resulting from the economic diplomacy index methodology, and a country single case study. However, data limitations do not limit our empirically valid conclusions that demand further support from future international empirical studies; we are sure will find support in our study.

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