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Do Economic and Financial Stabilities Matter for Political Stability in Estonia?

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Abstract
This study aims to investigate the causal impact of economic and financial stability on political stability in Estonia. With the purpose of determining robust results for the study in mind, both traditional and modern causality methods are employed. To that end, we utilized the nonparametric Diks and Panchenko causality and frequency-domain Granger causality tests. Our nonparametric causality findings reveal that changes in economic and financial stability in Estonia lead to significant changes in political stability, thus indicating how economic and financial factors are important for political stability in Estonia. These results are consistent with findings from spectral causality at different frequencies.

Keywords Economic stability · Financial stability · Political stability · Frequency-domain causality · Estonia

JEL Classification C53 · E17 · G00 · P00 · C50

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Introduction

Since the innovative study of Olson (1963), the nexus between political instability and economic growth has received significant attention from scholars. The political stability of a country should be ensured to make predictions about the economic development and future of that country and to reduce uncertainties. The lack of political stability can also affect the economic and financial stability in a country. The financial system represents the monetary system as well as agreements, institutions, and financial instruments in capital markets. In this context, failures that might arise in these markets adversely affect the distribution of resources and risk and prevent individuals from saving. Thus, the accumulation of capital, which is one of the important inputs of economic growth, decreases and it is difficult for societies to compete with other societies because their per capita income level decreases (Schinasi, 2004).

Disruptions in the financial system may also negatively affect real systems. As a result of the increase in interest rates together with the problems in the financial system, the financing costs of enterprises increase and their profitability decreases due to the decrease in credit facilities. Demand decreases and unemployment increases as prices of consumer goods rise (Alessandri & Mumtaz, 2017). In this context, the contraction in the real estate market in the USA in mid-2007 caused the spread of money and capital markets to many large financial institutions to cease and the effects of the financial crisis deepened. The unfavorable situation in the financial markets significantly affected the real economy associated with these markets and led to a decrease in the volume of trade and production.

Many financial measures have been attempted in developed and developing countries to combat the economic recession, but the problem of loss of confidence caused by the financial crisis has yet to be resolved. Therefore, growth rates decrease due to the slowdown in economic activities (Foster & Frieden, 2017). Due to the lack of liquidity in the markets, uncertainties in the value of nonperforming assets, and insufficient capital, countries have undergone various changes of after the 2008 global economic crisis. While applying monetary policy instruments such as interest rate changes, changes in required reserve ratios, and exchange rate intervention, it can be said that crisis prevention tools for the financial system are utilized in the form of increasing deposit guarantees, liquidity injection, expropriation, and the granting of government guarantees to bank and credit debts (Berger & Bouwman, 2017).

This reflects negatively on the macroeconomic balance and increases uncertainty in the economy because in times of political instability, governments invest in short-term and inefficient areas, particularly during election periods. At the same time, the increase in public expenditure leads to the exclusion of private sector expenditure, thus decreasing the country's production capacity. Another problem caused by political instability is the shortening of the average maturity of debt and rising borrowing costs due to the increasing interest rates. This situation causes both public and private sectors to transfer their resources from production areas to debt payments (Şanlısoy & Kök, 2013: 11).

One of the consequences of political instability is the outflow of both physical and financial capital from the country. Lensink et al. (2000) revealed that political risk causes an increase in the capital outflow. With foreign capital fleeing abroad, the prices of capital goods provided by the country and the cost of borrowing from abroad increase. Thus, growth rates decrease due to the decrease in capital. At the same time, due to instability in the country, the migration of the educated labor force that had been trained in the country accelerates. Differences in growth rates between countries in internal growth models are based on human capital. As countries with a qualified labor force produce the technology that is assumed to be external, productivity and consequently the production volume increase rapidly. Therefore, as a result of the political instability and the migration of the educated labor force, the slowdown of the economy becomes inevitable as a result of the population leaving the country to the detriment of the technological infrastructure.

A negative causal relationship may also emerge between economic growth and political instability. As a result of low economic growth, government changes might occur and socio-political problems could arise. This is due to the growth performance immediately before the elections to choose governments in democratic regimes, based on the theory of political cyclical fluctuations. In nondemocratic countries, low economic growth increases discontentment among people towards the regime and creates tendencies to engage in anti-regime activities that could lead to coups or revolutions (Telatar, 2003:76–77). Economic growth can instigate changes in the balance of power between different groups in society. Thus, as a result of the structural differences, coalitions can be dissolved, thus causing greater social and political instability. Another development associated with growth in the economy is the decrease in instability levels in society as social and political tensions decrease (Campos & Nugent, 2002). It can be said that social reconciliation will be achieved in both social and political terms as employment is created for more people through increased production activities. Therefore, to the best of our knowledge, no previous studies have explicitly investigated the causal effect of financial and economic stability on political stability in Estonia using time- and frequency-domain causality approaches. Thus, the major goal of the present research is to fill this gap in the literature by establishing time series–based causality models to examine whether Estonia's economic and financial stability affects political stability. In addition, the findings of the present study have noteworthy implications for Estonian policymakers.

In the current study, the aim is to investigate whether Estonia's economic and financial stability affects political stability using time- and frequency-domain causality tests. The Estonian government implemented various policies with the aim of liberalizing the economy after obtaining its independence. The most important of these arrangements are solid money, the removal of barriers to entry due to property-related reforms, the opening of the economy to the markets, privatization, and tax reform. A tight monetary policy and a balanced budget were implemented to ensure macroeconomic stability in Estonia after 1992. Additionally, tariffs and nontariff barriers to foreign trade were reduced and all barriers to exports were removed; furthermore, foreign capital was invested in the country in line with various regulations aimed at increasing foreign trade volume and liberalization in the financial system (Laar, 2007; Sepp, 1995).

In this context, the growth rate of the Estonian economy fell from 14 to 2% in the first stage (1991–1994), which was referred to as the foundation stage, while the growth rate reached 12% in the second stage (1995–1998) as a result of the consequences of reforms. In the third stage, as a result of the implementation of a new system for taxing the profits of entrepreneurs (1999), the GDP index was recorded as − 0.3%. Based on this tax system, economic growth stabilized for the eight years in the fourth stage (2000–2007), which was also the period in which the country entered the European Union. In the fifth phase, where the global economic crisis had a negative impact on the Estonian economy, the GDP index was − 14.3%, and as a result of the anti-crisis regulations implemented after the crisis, the economic growth in the sixth phase reached 7.5% in 2011 and around 2% in 2013 (Krysovatyi & Vasylchyshyn, 2017; Purju, 2013). Estonia's economic, financial, and political risk was at a low level in the period 2000–2007 due to the effects of entry into the European Union. The current account balance, which was negative due to the capital outflow and the decrease in investment demand resulting from the global economic crisis, became positive (Friedrich & Reiljan, 2015). Therefore, it can be seen in Fig. 1 that both economic and financial stabilities were at high risk during this period. In the aftermath of the global economic crisis, the Estonian government aimed to ensure financial stability in order to enter the eurozone. In this context, it has attempted to control the budget deficit by reducing expenditures below 3%.

Consequently, financial risk continued at a moderate level after 2010, while the increased risk in Nordic economies and banks as well as the deterioration of the external environment due to the Ukrainian problem and, consequently, the slowdown of economic growth caused a decrease in the borrowing capacity of banks and an increase in prices in the real estate market, which affected households and firms' behavior and the financial markets (Pank, 2014). Although the growth rate decelerated in the second half of 2016, due to the improvement in investments and the increase in foreign demand, the acceleration of export growth, the increase in the credit facilities of companies, and the decrease in nonperforming debts, the financial risk reached a moderate level. Figure 1 shows this decline (Swedbank, 2017).

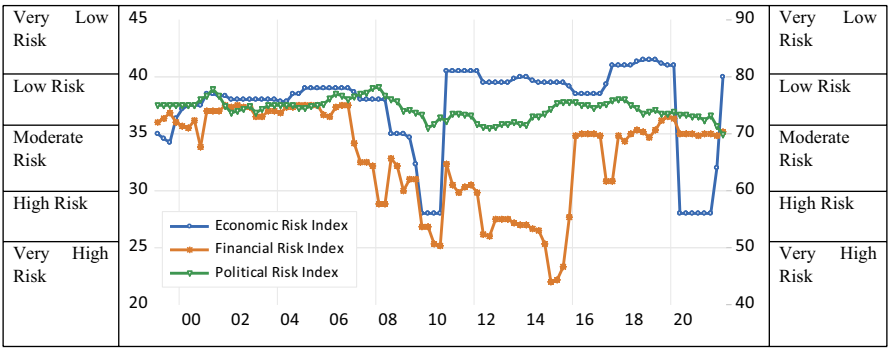

Fig. 1 Country risk indicators in Estonia. Source: International Country Risk Guide (ICRG)

The present study is organized as follows: The next section provides an overview of the literature on the concept. The third section provides information about the data and methodology used. This is followed by the empirical findings section, and finally, a concluding discussion.

Literature Review

In the literature, Olson (1963) first demonstrated the relationship between political instability and economic growth. In this study, he emphasized that political instability increases with economic development. He stated that while the real income of a large part of the population decreases, the welfare level of a small portion will increase, thus causing political instability (Korotayev et al., 2017). Barro (1991), Ades and Chua (1997), Alesina and Perotti (1996), Alesina et al. (1996), Asteriou and Price (2001), Fielding (2003), and Jong-A-Pin (2009) claimed that there is a negative relationship between instability and economic growth. Furthermore, Benhabib and Rustichini (1996) stated that political stability has an impact on economic growth in the absence of severe income inequality. Darby et al. (2004) and Devereux and Wen (1998) stated that economic growth will decrease due to the increase in public expenditure as a result of political instability.

Knack and Keefer (1995) emphasized that revolutions, military coups, and assassinations, which are measures of political stability as in Barro's study in 1991, have a negative impact on economic growth. Londregan and Poole (1990), on the other hand, observed no effect on economic growth. Acemoglu et al. (2003) stated that institutional instability causes political instability and that this also leads to the deterioration of macroeconomic outcomes through various channels. While Aisen and Veiga (2013) stated that political instability causes high inflation, they also showed that economic stability would lead to a higher growth rate in their 2010 study. Miljkovic and Rimal (2008) stated that income growth rates and initial income levels affect political instability based on their study of 122 countries. While Arslan (2011) and Kalay and Çetin (2016) both found a one-way causality relationship from economic growth to political instability, Akkuş (2017) determined this relationship is negative and Alper (2018) perceived it to be positive.

In terms of the relationship between financial development and economic growth, the first study to emerge in the literature was by Schumpeter (1911). According to his study, an advanced financial system will contribute to both technological innovation and economic growth. It also emphasized that financial services and resources will accelerate economic growth by backing entrepreneurs who invest in productive, innovative fields (Adusei, 2012: 266). Those who strongly supported this hypothesis include Goldsmith (1969), Shaw (1973), King and Levine (1993), and Rajan and Zingales (1998). Beck et al. (2000) showed that financial development accelerates economic growth by increasing total factor productivity. Cournède and Denk (2015) demonstrated that more financial development would increase economic growth in the long run. As economic costs increase and costs decrease, more resources are transferred to households and firms to invest in productive areas. Loayza and Ranciere (2004) stated that there is a positive relationship between financial services

and economic growth in the long term and a negative relationship in the short term. Demetriades and Hussein (1996) and Boyreau-Debray (2003) emphasized that financial services do not have an impact on economic growth, while Bezemer et al. (2014) emphasized that financial development promotes economic growth in the short term, but this relationship is negative in the long term. Moyo et al. (2018) found a negative relationship between the indicators of the banking sector, which is one of the components of financial development and economic growth, while they showed a positive relationship with the stock market, another area of financial services.

In this study, we examine the relationship between financial development and economic growth in terms of demand-oriented approaches. Greenwood and Smith (1997) and Romer (1986) stated that financial instruments and the financial system accelerate economic growth. They emphasized that this situation arises with the increasing demand for financial services. Waqabaca (2004), in a study based on the vector autoregressive model, showed a positive relationship between financial development and economic growth for Fiji. He also revealed that the causality relationship is one-way from economic growth to financial development. Odhiambo (2008) stated that there was a causal relationship from economic growth to financial development in the case of Kenya based on a dynamic causality test, while Zang and Kim (2007) stated that economic growth triggered financial development using the Sims-Geweke causality test in a study conducted on East Asian countries. Asteriou and Siriopoulos (2000), in a study evaluating the relationship between the stock market, political instability, and economic growth, stated that there is a negative relationship between the Athens Stock Exchange and political instability. Pástor and Veronesi (2013) found that economic and political instability increases risk premiums and volatility. In his study, Smales (2015) stated that increasing political uncertainty leads to higher uncertainty in financial markets, and Julio and Yook (2012) emphasized that political uncertainty will reduce the investment expenditure of companies. Kirikkaleli (2016) found that there is a positive relationship between financial stability and economic stability in seven selected countries in the long run. Białkowski et al.(2008), in a study conducted for 27 OECD countries, showed that the stock exchange variance doubled during election periods. Pantzalis et al. (2000) examined the stock market indices of 33 countries during election periods and revealed the existence of unusually positive returns. Brown et al. (1988) and Li and Born reached similar conclusions.

Data and Methodology

In this paper, we aim to explore the causal effects of economic and financial stability on political stability in Estonia using a quarterly dataset from the Political Risk Services (PRS) Group, covering the period of 1999Q1 to 2022Q1. The Economic Risk Index, Financial Risk Index, and Political Risk Index variables are used as proxies for economic stability, financial stability, and political stability, respectively. A brief description of the variables involved in this research is reported in Table 1.

Table 1 Data and descriptive statistics

	ES	FS	PS
Variable	Economic Risk Index	Financial Risk Index	Political Risk Index
Source	ICRG	ICRG	ICRG
Period		1998Q4–2022Q1	
Mean	37.48710	33.02330	74.31183
Median	38.50000	35.00000	74.50000
Maximum	41.50000	37.50000	78.16667
Minimum	28.00000	22.00000	69.83333
Std. Dev	3.795153	4.289747	1.734703
Skewness	−1.610585	−0.832848	−0.195629
Kurtosis	4.556257	2.483686	2.750061
Jarque–Bera	49.59176	11.78436	0.835268
Probability	0.000000	0.002761	0.658603
Observations	93	93	93

In this study, to determine the order of integration of economic, financial, and political stability variables, the Clemente-Montanes-Reyes (CMR) unit root test (Clemente et al., 1998) with double structural break was employed. Structural breaks, such as economic and banking crises, policy changes, and external shocks, can affect the long-run relationship between the variables; therefore, for the reliability of the results, it should be considered in the analysis (Ghosh & Kanjilal, 2016). Unit root tests, which take a structural break(s) into consideration to identify the integration properties of time-series data, have recently been utilized in the literature. In this regard, the CMR test with endogenously determined structural break outperforms the Zivot-Andrews (ZA) unit root test with endogenously determined structural break as it has the advantage of being able to investigate double structural breaks.

Then, as a first causality test, the Diks and Panchenko causality test proposed by Diks and Panchenko (2006) is implemented. The traditional Granger causality test proposed by Granger (1969) is employed to investigate whether there is an asymmetric one-way or two-way causal short-term interaction between ES, FS, and PS. In fact, the Diks and Panchenko test is an advanced type of the Granger causality test proposed by Hiemstra and Jones (1994). One of the main disadvantages of the nonlinear Granger causality test developed by Hiemstra and Jones was the spurious rejection of the null hypothesis. Due to this fact, Diks and Panchenko (2006) developed a new test statistic.

To investigate the causal impact of economic and financial stability on political stability at different frequencies in Estonia and also to provide an additional robustness check to the previous causality test, as a last causality test, we apply the frequency-domain causality test developed by Breitung and Candelon (2006). Following the previous works of Geweke (1982) and Hosoya (1991), the frequency-domain causality test was developed by Breitung and Candelon (2006). The test is known as the "Spectral BC causality test." The frequency-domain causality test allows us to evaluate causality

at different frequencies and it is based on linear constraints (Yanfeng, 2013). The Breitung and Candelon (2006) test procedure is detailed below.

Let $X_t = [ESt,\ FSt,\ PSt]'$ be a three-dimensional vector of endogenous and stationary variables observed at $t=1,\ldots\ldots,T$; then, X_t is assumed to have a finite-order VAR representative of order p,

$$\Phi(L)X_t, = \varepsilon_t, \tag{1}$$

where $\Phi(L)$ is a 2 by 2 lag polynomial order of p, which can be presented as, $\Phi(L) = I - \Phi_1 L^1 - \ldots - \Phi_p L^p$ with $L^k X_t = X_{t-k}$ and $L^k Y_t = Y_{t-k}$. The error vector (ε_t) follows the white noise process with an expectation of zeros, $E(\varepsilon_{t)} = 0$, and $(\varepsilon_t \varepsilon_t^{'}) = \Sigma$, where Σ is positive definite and symmetric.

In Cholesky decomposition represented by $G'G = \Sigma^{-1}$, G represents the lower triangular matrix of this decomposition, and G' represents the upper triangle matrix. Also, $E(n_t n_t^{'}) = I$ and $n_t = G\varepsilon_t$. Assuming that the system is stationary, the MA representation of the system can be shown as below:

$$X_t = \begin{pmatrix} \mathrm{FS}_t \\ \mathrm{PS}_t \end{pmatrix} = \Phi(L)\varepsilon_t = \begin{bmatrix} \Phi_{11}(L)\ \Phi_{12}(L) \\ \Phi_{21}(L)\ \Phi_{22}(L) \end{bmatrix} \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{2}$$

$$X_t = \begin{pmatrix} \mathrm{ES}_t \\ \mathrm{PS}_t \end{pmatrix} = \Psi(L)\eta_t = \begin{bmatrix} \Psi_{11}(L)\ \Psi_{12}(L) \\ \Psi_{21}(L)\ \Psi_{22}(L) \end{bmatrix} \begin{bmatrix} \eta_{1t} \\ \eta_{2t} \end{bmatrix} \tag{3}$$

where $\Phi(L) = \Phi(L)^{--1}$ and $\Psi(L) = \Phi(L)G^{-1}$. With this presentation, the spectral density of PS_t can be shown as

$$\mathrm{fPS}(\omega) = \frac{1}{2\pi}\left\{ \left|\Psi_{11}(e^{-i\omega})\right|^2 + \left|\Psi_{12}(e^{-i\omega})\right|^2 \right\} \tag{4}$$

Using Eqs. (3) and (4), political stability can be represented as the sum of two uncorrelated MA processes; in other words, the components are driven by the past realization of PS and the predictive power of the ES and FS variables. The predictive power of the economic stability and financial stability variables is expressed from each frequency $\boldsymbol{\omega}$ concerning the predictive component of the spectrum with the intrinsic component at that frequency. According to Breitung and Candelon (2006), the null hypothesis that the economic stability variable does not Granger cause political stability or financial stability can be rejected at frequency $\boldsymbol{\omega}$ if the predictive factor of the political stability spectrum at frequency $\boldsymbol{\omega}$ is zero, which is indicated by the causality tests of Geweke (1982) and Hosoya (1991) provided below:

$$M_{\mathrm{FS}\to\mathrm{PS}}(\omega) = \ln\left[\frac{2\pi \mathrm{f}_{\mathrm{FS}}(\omega)}{\left|\Psi_{11}(e^{-i\omega})\right|^2}\right] \tag{5}$$

$$= \ln\left[1 + \frac{\left|\Psi_{12}(e^{-i\omega})\right|^2}{\left|\Psi_{11}(e^{-i\omega})\right|^2}\right] \tag{6}$$

Also, according to Geweke (1982), the measure of causality will be zero when $\left|\Psi_{12}(e^{-i\omega})\right|^2 = 0$. Due to this fact, neither economic stability nor financial stability causes political stability at frequency $\boldsymbol{\omega}$. Breitung and Candelon (2006) offered a simplification of Eqs. (5) and (6) via linear restrictions on the coefficients of the first component of the VAR model (1), as shown in Eq. (7).

$$\mathrm{PS}_t = a_1\mathrm{PS}_{t-1} + ...a_p\mathrm{PS}_{t-p} + \beta_1\mathrm{ES}_{t-1} + ...\beta_p\mathrm{ES}_{t-p} + \beta_1\mathrm{FS}_{t-1} + \beta_p\mathrm{FS}_{t-p} + \varepsilon_{1t} \tag{7}$$

where α_i and β_i ($i = 1, 2, \ldots, p$) are the coefficients of the lag polynomials.

Therefore, the null hypothesis $M_{\mathrm{ES}\to\mathrm{PS}}(\omega) = 0 \mathrm{or} M_{\mathrm{FS}\to\mathrm{PS}}(\omega) = 0$ is equivalent to the linear restriction such that $H_0 : R(\omega)\beta = 0$, where $\beta = [\beta_1, \ldots, \beta_p]'$ is the vector of the coefficients of ES or FS, while $R(\omega)$ is as follows:

$$R(\omega) = \left[\frac{\cos(\omega)\cos(2\omega)\ldots\cos(p\omega)}{\sin(\omega)\sin(2\omega)\ldots\sin(p\omega)}\right] \tag{8}$$

The ordinary F statistic for the above VAR model of order p is approximately distributed as $F(2, T-2p)$ for $\omega \in (0, \pi)$, where 2 is the number of restrictions and T is the number of observations.

Empirical Findings

In order to investigate the causal impact of economic and financial stability on political stability in Estonia, the Clemente-Montanes-Reyes unit root test, which has considerably improved power over the augmented Dickey-Fuller and the Phillips-Perron unit root tests in the existence of structural breaks, is applied to verify whether or not each variable contains a unit root. Also, the Zivot-Andrews test is not preferred as it does not consider double structural breaks. In the meanwhile, when performing the abovementioned test, it is assumed that the time-series data has no structural breaks. The lack of identification of the order of integration of the variables would lead to misinterpretation of the empirical findings such as spurious regression. To avoid misleading empirical findings, the Clemente-Montanes-Ryes unit root test with endogenously determined structural break is applied on economic stability (ES), financial stability (FS), and political stability (PS). The results of these unit root tests are given in Table 2. Based on the findings, the null hypothesis that indicates that PS and FS are stationary at levels cannot be rejected. However, only for the ES the null hypothesis can be rejected at 5% level of significance. Nevertheless, when the first differences of the PS and FS time series are taken, they become stationary at 5% level of significance. Hence, it can be said that their series are integrated of order one, I(1), and both political stability and financial stability are affected by structural

Table 2 Clemente-Montanes-Reyes unit root with double structural break

	Level	First difference			
Variables	*T*-stat	*T*-stat	TB1	TB2	Decision
PS	(−4.278)	(−6. 554)*	2005Q1 (2.788)*	2007Q4 (− 3.689)*	I(1)
FS	(−1.832)	(−6.749)*	2006Q1 (− 4.224)*	2008Q4 (2.147)*	I(1)
ES	(−14.267)*	N.A	2008Q4 (− 10.369)*	2009Q4 (11.568)*	I(0)

The values in the (·) denote *t*-statistics. *The null hypothesis can be rejected at 5% level. While TB1 denotes the first structural break, TB2 denotes the second structural break

breaks. As represented by TB1 and TB2 in Table 2, two structural breaks exist. Dates of breaks are endogenously determined as years reflecting outstanding circumstances, which had an effect on economic, financial, and political stability in Estonia. Global circumstances such as the global financial crisis should also be considered.

To investigate the nonlinearity in the time series variables, the Brock, Dechert, and Scheinkman (BDS) test of Broock et al. (1996) is utilized as the next step in this study. The findings of the BDS test for the variables of FS, PS, and ES in Estonia are reported in Table 3. As there is sufficient evidence to conclude that the i.i.d assumption of independence is rejected at the 5% significance level for Estonia, this indicates that the threshold cointegration test which allows structural breaks and nonlinear causality test can robustly forecast the long-term and causal effects of economic stability and financial stability on political stability in Estonia.

Table 3 BDS dependency test

	Dimension	BDS statistic	Std. error	*z*-statistic	Prob
PS	2	0.0293	0.0034	8.6256	0.0000*
	3	0.0587	0.0074	7.8711	0.0000*
	4	0.0880	0.0122	7.1948	0.0000*
	5	0.1172	0.0175	6.6799	0.0000*
	6	0.1463	0.0232	6.2836	0.0000*
FS	2	0.1404	0.0066	21.0353	0.0000*
	3	0.2242	0.0106	21.1129	0.0000*
	4	0.2784	0.0126	21.9895	0.0000*
	5	0.3074	0.0132	23.2771	0.0000*
	6	0.3161	0.0127	24.7997	0.0000*
ES	2	0.1689	0.0157	10.7233	0.0000*
	3	0.2850	0.0253	11.2584	0.0000*
	4	0.3586	0.0305	11.7545	0.0000*
	5	0.4003	0.0322	12.4335	0.0000*
	6	0.4197	0.0314	13.3454	0.0000*

*rejection of i.i.d assumption at the 5% significance level, correspondingly. The optimal lag for each model is selected using the Schwarz information criterion

After determining the linearity of the time series variables by the BDS test, nonparametric Diks and Panchenko, frequency-domain, and Spectral Granger causality tests are employed to explore the causal impact of economic and financial stability on political stability in Estonia covering the period of 1998Q4 to 2022Q1. Table 4 summarizes the results from these causality tests. Focusing on the nonparametric Diks and Panchenko causality test outcomes, the null hypotheses that economic stability does not Granger cause political stability and financial stability can both be rejected at the 5% level of significance, indicating the importance of both economic stability and financial stability in predicting political stability. The findings from the nonparametric causality test shed light on the evidence that changes in economic and financial stability in Estonia significantly lead to changes in political stability.

Following the exploration of the causal impact of economic and financial stability on political stability by employing the time-domain causality tests, we apply the frequency-domain causality test proposed by Breitung and Candelon (2006) to determine the predictive power of economic stability and financial stability for Estonia's political stability at various frequencies. The spectral Granger causality test enables the decomposition of the causality test statistic into various frequencies in different cycles. The test statistics are determined at low ($\gamma = 0.01$ and 0.05), medium ($\gamma = 1.00$ and 1.50), and high ($\gamma = 2.5$ and 3) frequencies. Low frequencies can be interpreted as a permanent causality, whereas high frequencies can be determined as a temporary causality. The results of the spectral Breitung and Candelon (BC) causality tests can be seen in Figs. 2 and 3.

Straight and dashed lines represent 5% and 10% levels of significance, respectively, while the dashed curve represents the statistical tests at different frequencies between the intervals of (0, π). Based on the outcomes of the test, the null hypothesis that economic stability does not Granger cause political stability can be rejected for frequencies in the intervals 1 and 3 at the 5% significance level. In other words, at the 5% significance level, a unidirectional causality runs from economic stability to political stability in the medium and short terms. As previously mentioned, medium and high frequencies represent the temporary causality; hence, we can interpret that economic stability is a predictable temporary unit for political stability in Estonia. Also, these findings reveal that the predictive power of economic stability over political instability is mainly concentrated in the short and medium terms.

Table 4 Nonparametric causality tests

	DP nonparametric causality	
Dependent	Independent variables	
Variable	ES	FS
PS	<1.657> (0.048)*	<2.586> (0.004)*

*statistical significance at the 5% significance levels. The values within the (·) and <·> symbols denote the *p*-values and the *t*-statistics, respectively

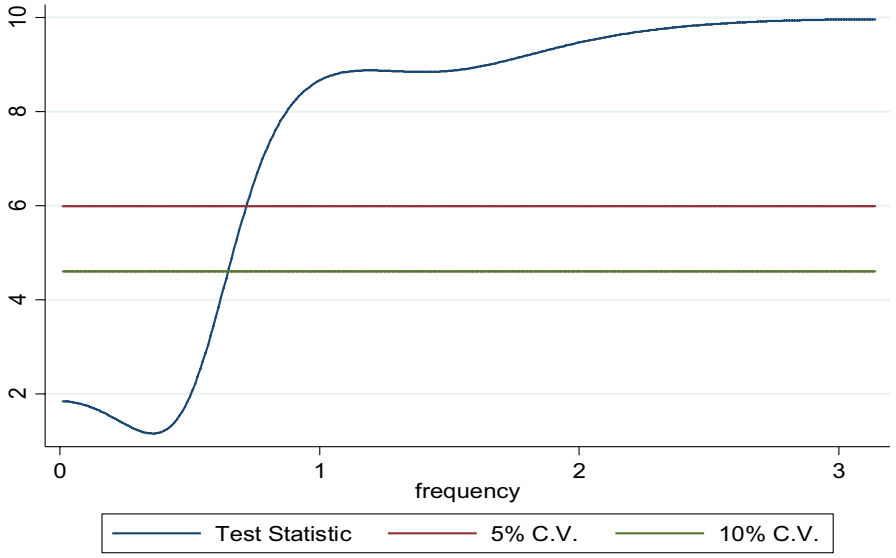

Fig. 2 Spectral BC causality from ES to PS

In line with the outcome of Fig. 2 and also as observed in Fig. 3, the spectral BC causality test does not provide any evidence for a causal linkage from financial stability to political stability in the long term or permanent time interval at 5% level of significance However, similar to the economic stability results, for frequencies in the between 1.1 and 3 at 5% significance levels, there is a causal linkage from financial stability to political stability. The outcome from the spectral BC causality test is

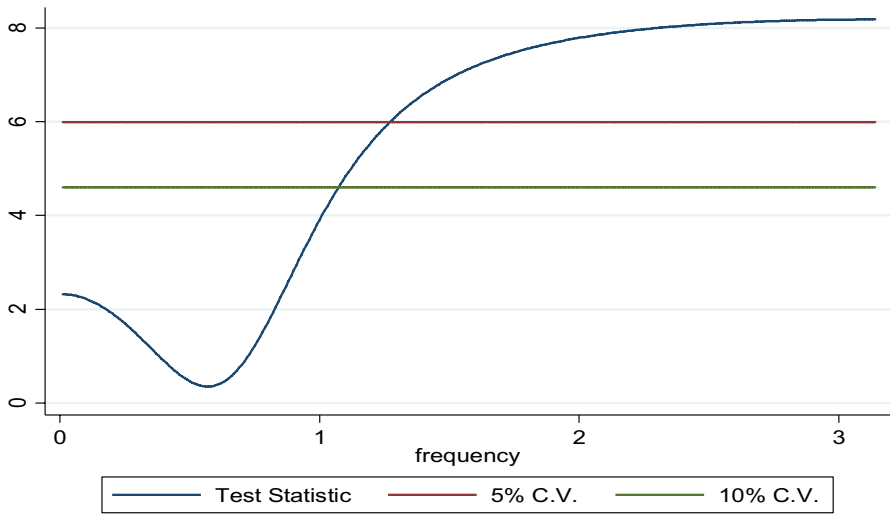

Fig. 3 Spectral BC causality from FS to PS

consistent with the results obtained by the conventional causality tests. It is important to note that the conventional causality tests are only able to determine if economic and financial stability can cause price stability, whereas the spectral BC causality test is better at revealing the extent of the causality in the frequency domain. The results of the frequency-domain causality are superior to those in the time domain in terms of determining whether the causality is temporary or permanent.

Conclusion and Policy Implications

Since the innovative study of Schumpeter (1911), the nexus between financial development and economic growth has been investigated by numerous subsequent studies. However, there is no consensus in the literature regarding the direction of the relationship. Furthermore, studies have mainly focused on the relationship between economic growth and financial stability and only a limited number have concentrated on including political stability. Also, there is a lack of empirical studies for Estonia about the predictive power of economic stability and financial stability on political stability. As the causal impact of economic and financial stability on political stability in Estonia can reveal rich policy implications for investors, macroeconomic policymakers, and researchers, this study aims to shed light on the political stability to benefit the empirical literature. To that end, we employed time-domain causality (nonparametric Diks and Panchenko causality) and frequency-domain causality(Spectral Granger causality) tests. Through the frequency-domain causality test in this study, we aimed to capture the possible short-, medium-, and long-term causal relationship among the variables of interest separately.

Our time-domain causality findings reveal that changes in economic and financial stability in Estonia lead to significant changes in political stability, indicating the level of importance of economic and financial factors for political stability in Estonia. The results of the frequency-domain causality test of Breitung and Candelon (2006) are consistent with the findings from the time-domain causality tests at different frequency levels. The frequency-domain causality test results bring to light crucial short-run and long-run policy implications. In general, the implications of this study are that the Estonian macroeconomic policymakers and government should take action if necessary, focus on economic and financial development, and implement more appropriate decisions and even regulations in their country in order to achieve political stability. Although this study has provided robust empirical findings, forthcoming studies should be performed in different countries that previously formed the Soviet Union.

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