The dynamic relationship between Financial Development and the Energy Demand in North Cyprus: Evidence from ARDL Bounds and Combine Cointegration Tests

Tursoy, Turgut

Near East University

2 August 2018

The dynamic relationship between Financial Development and the Energy Demand in North Cyprus: Evidence from ARDL Bounds and Combine Cointegration Tests

Turgut Tursoy

Department of Banking and Finance, Near East University, Nicosia, North Cyprus, Mersin 10 - Turkey

Abstract

This paper investigates the dynamic relationship between financial development, energy demands, economic growth and total trade with the ARDL Bounds and Combined cointegration approaches in North Cyprus for the period of $1977_{Q1} - 2016_{Q4}$. The empirical results provide evidences for the long-run and short-run relationship between the concern variables. All the techniques such as cointegration and innovation accounting method supporting the relationship between variables. Positive innovation in GDP is connected with increase in financial development and energy demands. Energy demands response positively for the shocks from GDP and Financial development, and financial development responses just only GDP and itself.

Keywords: Financial development, GDP, Energy, Trade

Jel Clasifications: Q43, E44, O43

Introduction

Energy consumption is the most critical input into the industry. In North Cyprus, electricity is the primary source in energy demand. The vast amount of studies recently connect finance and economic growth with the energy issues. Likewise, significant studies[1] in the literature have recently investigated the dynamic connection between the financial development, energy consumption and economic growth. Although, there are also another studies like Faisal et al. (2016), Faisal et al. (2018 a,b) that investigate the concern relationship between electricity consumption with the economic issues. Like the previous studies, this study using the Net Electricity Consumption (Million KWH) for the energy demand for North Cyprus to investigate the long-run and short-run dynamics. Specifically, in order to investigate the financial development effect on the energy demand and economic growth in this study, financial depth indicator used to modelling the concern relationship. Türsoy and Faisal (2018) studied the financial depth impact on the economic growth in North Cyprus by using the total deposits in the banking sector for North Cyprus. Likely with Türsoy and Faisal (2018), this study using the total deposit as a financial development indicator in North Cyprus. Ideally, in order to identify the correct financial development indicator for a country, its need to be observed the financial market

[1] Sadorsky (2010), Sadorsky (2011), Shahbaz and Lean (2012), Shahbaz (2013), Shahbaz et al. (2013), and Fahrani and Solarin (2017).

structure. In North Cyprus's financial system, banks are the dominant institutions to serve the financial services for the economic units. Therefore, to understand the short-run and long-run impact of the financial system on North Cyprus' economy; it is essential to use the correct indicator for financial development to drive a real conclusion about the relationship between financial development, economic growth and energy demand. Literature proposed that financial development is lowering the energy consumption in countries based on the high efficiencies in its used (Farhani and Solarin, 2017). Although, North Cyprus is a small island economy and in this study assumed that with the existing development level in the economy, financial development might be effect positively on the economic development and energy demand in the country. Specifically, at the developing stage of the small island economy, any development of the financial system may encourage the firms to have more financial sources to increase the output into the economy. Thus, any progress in the economy, therefore, increases the energy demand at the firm level to produce more output. Moreover, with the light of the literature, the total trade indicator also added to the dynamic relationship between the concerns relationship.

The main purpose of this study is to investigate the short-run and long-run dynamics among energy demand, financial development, economic growth and trade openness for North Cyprus. This study contributes the existing literature on finance-growth-energy demand in several ways. First, this study investigates the North Cyprus which has been the first attempt in the literature. This economy is a part of the small island economy, and its improve financial depth[2] in the last years. Also, it is an important contribution to investigating the finance-growth nexus with the energy demands in North Cyprus. Secondly, to obtain robust results, this study uses the ARDL bounds test which is proposed by Pesaran et al. (2001) and combined cointegration techniques together. The Combined cointegration techniques are proposed by Bayer and Hanck (2013) and its explain well with the study Türsoy (2017). This cointegration technique is combined four type of cointegration technique. Thirdly, this study includes a new variable of financial development which is representing the financial depth for North Cyprus. Also, Trade openness as another additional variable included to the finance-growth-energy nexus into the equation. Fourthly, the quadratic match-sum method applied to the data to convert the yearly basis to the quarterly basis. With this method observation improved and reaches to the 160, and this method which is transforming the data, solving the problem related to the seasonal variation.

Literature Review

The dynamic links between energy consumption, economic growth, financial development and trade investigated by Shahbaz et al. (2013) for China. There are significant studies that show the positive enhancement of economic growth with financial development; for instance, Sadorsky (2010, 2011) and Shahbaz and Lean (2012). Sadorsky (2011) state that financial development increases the access to the financial resources that improve the energy demands and also having indirect positive effects on to boost business activity. Therefore, the overall effects are to increase

[2] See more information Türsoy and Faisal (2018).

the energy uses. Shahbaz and Lean (2012) found that financial development boosts energy demands. Also, Bell and Rousseau (2001) provide evidence that financial development promotes economic growth by increasing efficiency.

Data

This study uses quarterly data from 1977q1-2016q4. The data were collected by the State Planning Organization of North Cyprus. To represent energy demand, this study uses the Net Electricity Consumption (Million KWH) with the notation of *E*. To capture the effects of financial development, the total deposits in the banking system is used (*FD*), following the study of Türsoy and Faisal (2018) and others. Economic growth is measured by the gross domestic product (*Y* – GDP). Last, the trade openness (*T*) is represented total trade (sum of exports and imports: value goods).

In addition, this study uses the quadratic match-sum method to transform the annual data to quarterly data. This attempt increases the observation substantially and solves the problems related with seasonal variation. Figure 1 represent the graphical observation of the series.

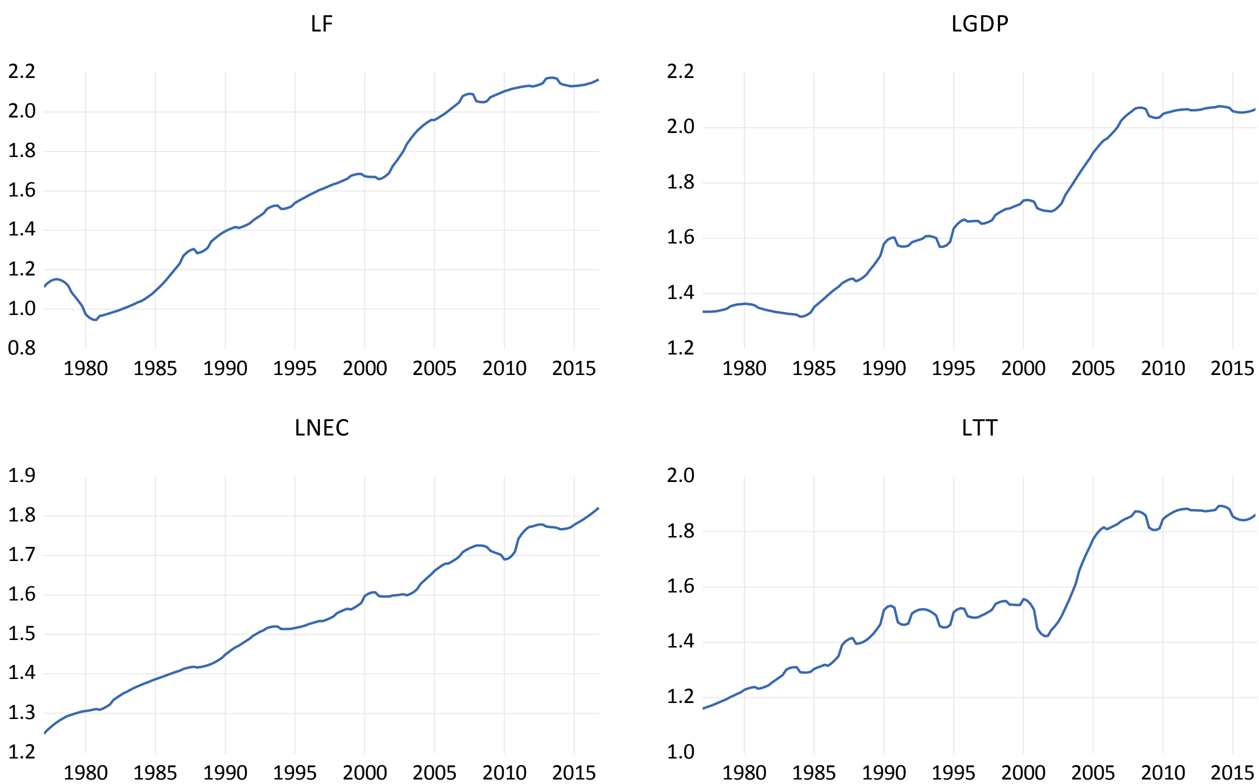

Figure 1. The graphical inspection of the series, where F is financial development, GDP is a gross domestic product, NEC is energy demands, and TT is traded openness [from 1977q1 to 2016q4]. Source: State Planning Organization of North Cyprus.

Methodology

In this study, the ARDL bounds testing approach which is developed by Pesaran et al. (2001) used to investigate the dynamic relationship between financial development, economic growth, energy demands and trade openness. The ARDL model for standard log-log functional specification between concern variables as follows.

$$\Delta lnE = \beta_0 + \sum_{i=1}^{n1} \beta_{1i}\,\Delta lnE_{t-i} + \sum_{i=1}^{n2} \beta_{2i}\,\Delta lnY_{t-i} + \sum_{i=1}^{n3} \beta_{3i}\,\Delta lnFD_{t-i} + \sum_{i=1}^{n4} \beta_{4i}\,\Delta lnT_{t-i} + \lambda_1\, lnE_{t-1} + +\lambda_2\, lnY_{t-1} + \lambda_3\, lnFD_{t-1} + \lambda_4\, lnT_{t-1} + \upsilon_1 t, \quad (1)$$

$$\Delta lnY = \beta_0 + \sum_{i=1}^{n1} \beta_{1i}\,\Delta lnY_{t-i} + \sum_{i=1}^{n2} \beta_{2i}\,\Delta lnE_{t-i} + \sum_{i=1}^{n3} \beta_{3i}\,\Delta lnFD_{t-i} + \sum_{i=1}^{n4} \beta_{4i}\,\Delta lnT_{t-i} + \lambda_1\, lnY_{t-1} + +\lambda_2\, lnE_{t-1} + \lambda_3\, lnFD_{t-1} + \lambda_4\, lnT_{t-1} + \upsilon_1 t, \quad (2)$$

$$\Delta lnFD = \beta_0 + \sum_{i=1}^{n1} \beta_{1i}\,\Delta lnFD_{t-i} + \sum_{i=1}^{n2} \beta_{2i}\,\Delta lnY_{t-i} + \sum_{i=1}^{n3} \beta_{3i}\,\Delta lnE_{t-i} + \sum_{i=1}^{n4} \beta_{4i}\,\Delta lnT_{t-i} + \lambda_1\, lnFD_{t-1} + +\lambda_2\, lnY_{t-1} + \lambda_3\, lnE_{t-1} + \lambda_4\, lnT_{t-1} + \upsilon_1 t, \quad (3)$$

$$\Delta lnT = \beta_0 + \sum_{i=1}^{n1} \beta_{1i}\,\Delta lnT_{t-i} + \sum_{i=1}^{n2} \beta_{2i}\,\Delta lnY_{t-i} + \sum_{i=1}^{n3} \beta_{3i}\,\Delta lnFD_{t-i} + \sum_{i=1}^{n4} \beta_{4i}\,\Delta lnE_{t-i} + \lambda_1\, lnT_{t-1} + +\lambda_2\, lnY_{t-1} + \lambda_3\, lnFD_{t-1} + \lambda_4\, lnE_{t-1} + \upsilon_1 t, \quad (4)$$

Where Δ is the first different operator and while $\upsilon_1 t$ and $\upsilon_2 t$ is the error terms. The error terms should be White noise. The Akaike Information Criterion (AIC) used to be selecting the lag length selection, and in the ARDL modelling, the null hypothesis of no cointegration between two variables is examined by the F-statistics. Estimated F-statistics usually compared with the two critical values (upper-bound and lower-bound). When the cointegration is testifying with the F-statistics, it can proceed to investigate the long-run (eq. 5-8) and short-run (eq. 9-12) coefficients with the following equations.

$$lnE_t = \alpha_1 + \sum_{j=1}^{p} \varphi 1_j \, lnE_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln Y_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln FD_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln T_{t-i} + \mu_t \quad (5)$$

$$lnY_t = \alpha_1 + \sum_{j=1}^{p} \varphi 1_j \, lnY_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln E_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln FD_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln T_{t-i} + \mu_t \quad (6)$$

$$lnFD_t = \alpha_1 + \sum_{j=1}^{p} \varphi 1_j \, lnFD_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln E_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln Y_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln T_{t-i} + \mu_t \quad (7)$$

$$lnT_t = \alpha_1 + \sum_{j=1}^{p} \varphi 1_j \, lnT_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln E_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln FD_{t-i} + \sum_{j=1}^{p} \omega 1_j \ln Y_{t-i} + \mu_t \quad (8)$$

$$\Delta lnE_t = \gamma_0 + \sum_{j=1}^{p1} \gamma_{1i} \, \Delta lnE_{t-i} + \sum_{j=1}^{p2} \gamma_{2i} \, \Delta lnY_{t-i} + \sum_{j=1}^{p3} \gamma_{3i} \, \Delta lnFD_{t-i} + \sum_{j=1}^{p4} \gamma_{4i} \, \Delta lnT_{t-i} + \psi ECT_{t-1} + \vartheta t, \quad (9)$$

$$\Delta lnY_t = \gamma_0 + \sum_{j=1}^{p1} \gamma_{1i} \, \Delta lnY_{t-i} + \sum_{j=1}^{p2} \gamma_{2i} \, \Delta lnE_{t-i} + \sum_{j=1}^{p3} \gamma_{3i} \, \Delta lnFD_{t-i} + \sum_{j=1}^{p4} \gamma_{4i} \, \Delta lnT_{t-i} + \psi ECT_{t-1} + \vartheta t, \quad (10)$$

$$\Delta lnFD_t = \gamma_0 + \sum_{j=1}^{p1} \gamma_{1i} \, \Delta lnFD_{t-i} + \sum_{j=1}^{p2} \gamma_{2i} \, \Delta lnY_{t-i} + \sum_{j=1}^{p3} \gamma_{3i} \, \Delta lnE_{t-i} + \sum_{j=1}^{p4} \gamma_{4i} \, \Delta lnT_{t-i} + \psi ECT_{t-1} + \vartheta t, \quad (11)$$

$$\Delta lnT_t = \gamma_0 + \sum_{j=1}^{p1} \gamma_{1i} \, \Delta lnT_{t-i} + \sum_{j=1}^{p2} \gamma_{2i} \, \Delta lnY_{t-i} + \sum_{j=1}^{p3} \gamma_{3i} \, \Delta lnFD_{t-i} + \sum_{j=1}^{p4} \gamma_{4i} \, \Delta lnE_{t-i} + \psi ECT_{t-1} + \vartheta t, \quad (12)$$

In the short-run equations, error terms represents threpresent adjustment which are converge convergeslong-run equilibriums (ECT_{t-1}). This term should be negative and its needs to be between 0 and 1.

Bayer and Hanck (2013) combined four methods such as a residual-based test of Engle and Granger (1987), the system-based test of Johansen (1988), and error-correction-based tests of Boswijk (1994) and Banerjee et al. (1998). The combined cointegration is relied on the Fisher's formula to observe the significance of various individual cointegration tests based on the p-values. Formulas as shown below,

ENG & GRA - JOHAN= -2[ln($P_{ENG\&GRA}$) + ln(P_{JOHAN})] (3)

ENG & GRA – JOHAN – BOS – BDM = $-2[\ln(P_{ENG\&GRA}) + \ln(P_{JOHAN}) + \ln(P_{BOS}) + \ln(P_{BDM})]$ (4)

Where $P_{ENG\&GRA}$, P_{JOHAN}, P_{BOS}, P_{BDM} are the p values for various cointegration tests. The null hypothesis of no cointegration is rejected if the estimated Fisher statistics value exceeds the critical values at 1%, 5% and 10%. These critical values are provided by the Bayer and Hanck (2013) combined cointegration method.

Empirical Results

Before applying the cointegration methods; first, Perron and Vogelsang (1992) unit root test which takes into account one structural break was used to determine the order of integration of variables. The results of the unit root test have been reported in table 1. The result of the Perron and Vogelsang (1992) test show all the variables are non-stationary at the level and stationary at first difference. Also, break dates are represented at the same table. All variable is showing the same order of integration (I(1)). Based on the unit root test results, its allowed us to apply the ARDL bounds and Combined cointegration test results to investigate the long-run relationship between the variables.

Table 1. Perron–Vogelsang test with one Endogenous Structural Break

Variables	Perron–Vogelsang test with one Endogenous Structural Break				
	AO -model *t*-Statistics	TB1	IO-model *t*-Statistics	TB1	Result
LF_t	-2.687 (1)	Jan 2008	-1.361 (1)	Jan 2001	$I(0)$
$LGDP_t$	-2.851 (1)	Jan 2009	-2.289 (1)	Oct 2001	$I(0)$
$LNEC_t$	-2.186 (0)	Jul 2005	-1.592 (1)	Jan 2003	$I(0)$
LTT_t	-3.202 (1)	Jan 2006	-3.778 (1)	Jul 2001	$I(0)$
First Difference					
DLF_t	-6.066* (0)	Apr 1981	-5.517* (0)	Oct 2007	$I(1)$
$DLGDP_t$	-5.379* (1)	Jul 1989	-6.537* (0)	Oct 1993	$I(1)$
$DLNEC_t$	-6.611* (1)	Jul 2010	-6.672* (0)	Oct 2009	$I(1)$
$DLTT_t$	-6.343* (1)	Jul 2000	-7.724* (0)	Oct 2000	$I(1)$

Note: * represents significance at 5%.

Perron and Vogelsang (1992) unit root test has two models such as an additive outlier (AO) and an innovative outlier (IO). Both models results are reported in table 1 and both methods supporting the result of that all variables are non-stationary at level.

After the orders of integration are determined by the unit root tests, it can proceed to the cointegration analysis with ARDL bounds and combined frameworks. The long-run and short-run results are reported in Table 2 based on the Bounds test and error correction terms. All the models are confirming the dynamic long-run relationship among the variables. All the F-statistics based on the models are higher than the upper bounds critical values at the 1 percent level. The critical values for both upper and lower bounds are represented at table 2, and the results confirm the long-run relationship between the variables. Also, the same table provides the error correction term statistics for the short-run disequilibrium. The results are varying between the 1 percent and 14 percent of the speed of adjustments for the short-run dynamics. All the error correction terms are negative and significant at the level of 1 percent.

Table 2. Results of the Bounds test of Cointegration and Ect_{-1} term from short-run dynamics.

Estimated Model	F_{LnF}(LnF/LnY,LnE, Ln T)	F_{LnY}(LnY/Ln F, LnE, LnT)	F_{LnE}(LnE/Ln F, LnY, LnT)	F_{LnT}(LnT/Ln F, LnE, LnY)
Optimal Lag Length (AIC)	(1,1,1,1)	(1,1,1,1)	(3,2,2,2)	(1,1,1,1)
F-Statistics (Bound Test)	**5.388***	**7.384***	**6.742***	**5.339***
Critical Values	1 Percent	2.5 Percent	5 Percent	10 Percent
Lower Bounds *I*(0)	4.3	3.8	3.38	2.97
Upper Bounds *I* (1)	5.23	4.68	4.23	3.74
Ect_{-1}	**-0.0183***	**-0.0684***	**-0.1409***	**-0.0310***
R^2	0.999	0.999	0.999	0.999
Adj. R^2	0.999	0.999	0.999	0.998
F-Statistics	27260.71*	56150.90*	29252.29*	16.282.90*

Note: * represent significance level at 1%. The optimal lag length for ARDL model was chosen on the basis of AIC. The critical values mentioned in the above Table were obtained from Pesaran *et al.* (2001). Both ARDL models run with the case 4 (unrestricted constant and restricted trend).

In order to confirm the results of the Bounds test, the robustness of the ARDL model testify by the newly developed Bayer-Hanck (2013) combined cointegration method. This test jointly produces the Fisher statistic for cointegration that is based on Boswijk, Johansen, Engle and Granger, and Banerjee et al. tests. This joint test is providing more consistent and reliable test results. The combined cointegration test results are showing in table 3.

Table 3. Bayer–Hanck cointegration test results

Model specification	Fisher statistics		Cointegration Decision
	ENG&GRA	ENG&GRA – JOHAN – BOS – BDM	
F_{LE}= *f(LE/LY,LF,LT)*	55.5449*	58.7710*	Cointegration exists
F_{LF}= *f(LF/LY,LE,LT)*	56.5672*	64.0259*	Cointegration exists
F_{LY}= *f(LY/LF,LE,LT)*	58.7582*	122.4738*	Cointegration exists
F_{LT}= *f(LT/LF,LE,LY)*	56.3646*	69.1286*	Cointegration exists
Significance level	Critical values		
Significance level at 1%	16.259	31.169	

Note: * represents significance level at 1%.

Table 3 results are providing the same results with the ARDL bounds test of cointegration. The Fisher statistics for ENG & GRA and ENG & GRA–JOHAN–BOS–BDM are greater than the critical value at 1%. Therefore, test results rejecting the null hypothesis of no cointegration. The Bayer-Hanck test corroborates the findings obtained from the ARDL bounds test. Consequently, it can be concluded that there is a long-run equilibrium among the concern variables.

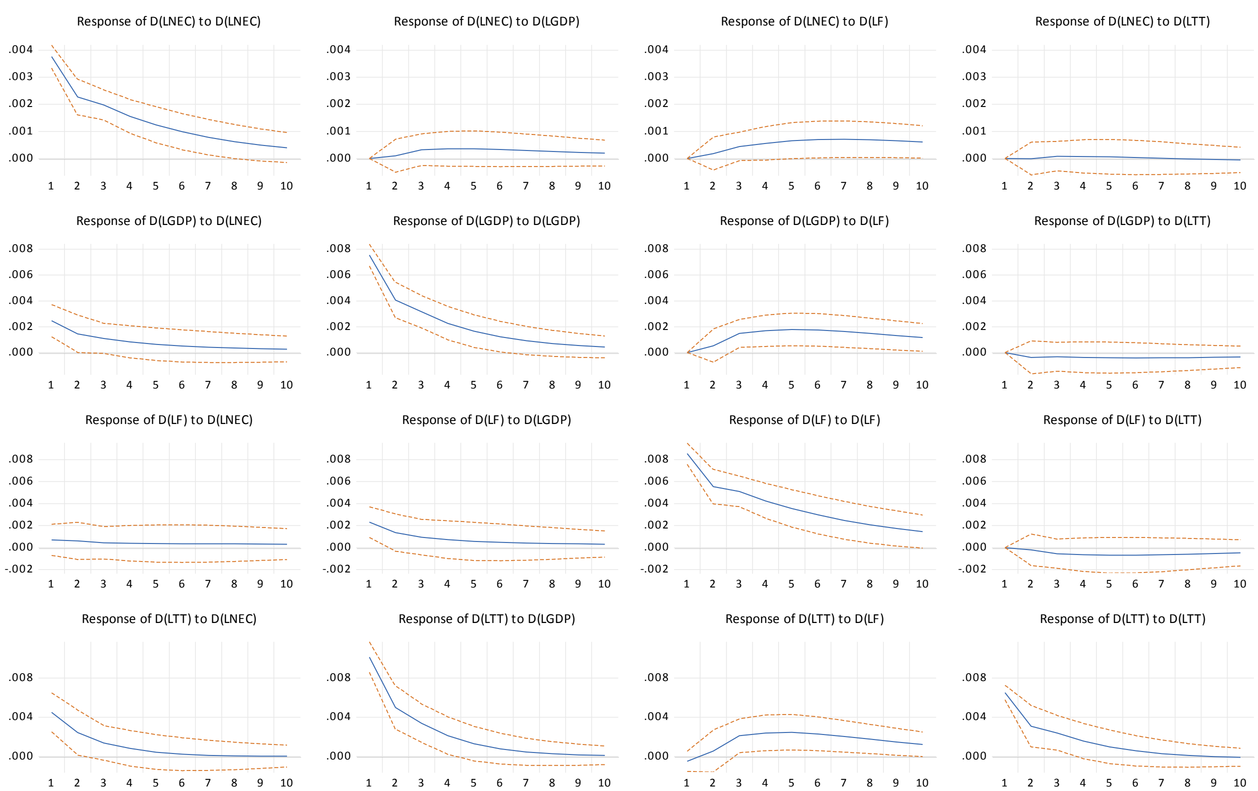

Figure 2. Impulse response to Cholesky one S.D. (d.f. adjusted) innovations.

The impulse responses of variables in the VECM model to one-standard-deviation structural innovations are shown in Fig. 1. The dashed lines represent a one standard error confidence band around the estimates of the coefficients of the impulse response functions. The first row in the below figure represents the response of the energy demands to the innovations in GDP, financial development and total trade. Similarly, the second, third and fourth r toows show the response of GDP, financial development and total trade, respectively, to innovations in Δlog (E_t), Δlog (GDP_t), Δlog (FD_t) and Δlog (TT_t).

In the first row of Fig.1, a positive shock to the energy demands is associated with rising financial development in North Cyprus. It's showing statistically significant and persistent positive effects in energy demand with the increase in financial development. The result indicates that the rise in financial development which is the financial depth in the financial market; the energy demands are increasing in North Cyprus’ economy. This is assumed whit this study at the beginning of the article that with the existing level of the economic progress, financial development might increase the energy demand to produce more final goods. The response of the GDP to the energy demands are statistically significant and positive. Immediate response to the shock from energy demands of GDP is persistence and declining over the periods. Also, GDP is showing statistically significant and positive response for the financial development in North Cyprus’s economy. Based on the findings, economy giving positive response for the financial development and the shocks are significant after the period 3 and persistence over the rest of the periods. Same like the previous explanation, GDP has positive and statistically significant shocks to the financial development. This result supports the view that economic growth improves the financial development in a country. Both variables like GDP and financial development giving positive shocks to each others. In other words, both variables showing responses to each others. In the fig. 1, last row showing total trade responses to the other variables and the results report positive and significant responses for all variables.

An alternative method of innovation accounting is to decompose the observed series into the the variable corresponding to the each shocks. Burbridge and Harrison (1985) provide the framework to transform the residual to structural residuals. Normally, each observation beyond some point in the sample, computing the contribution of the different accumulated structural shocks to each variables. Below, the fig. 2 observed the accumulated structural shocks of variable from the other variables with the format of combined graph. Consequently, these figures explain the variation of the observed variable with the other variables in the concern period.

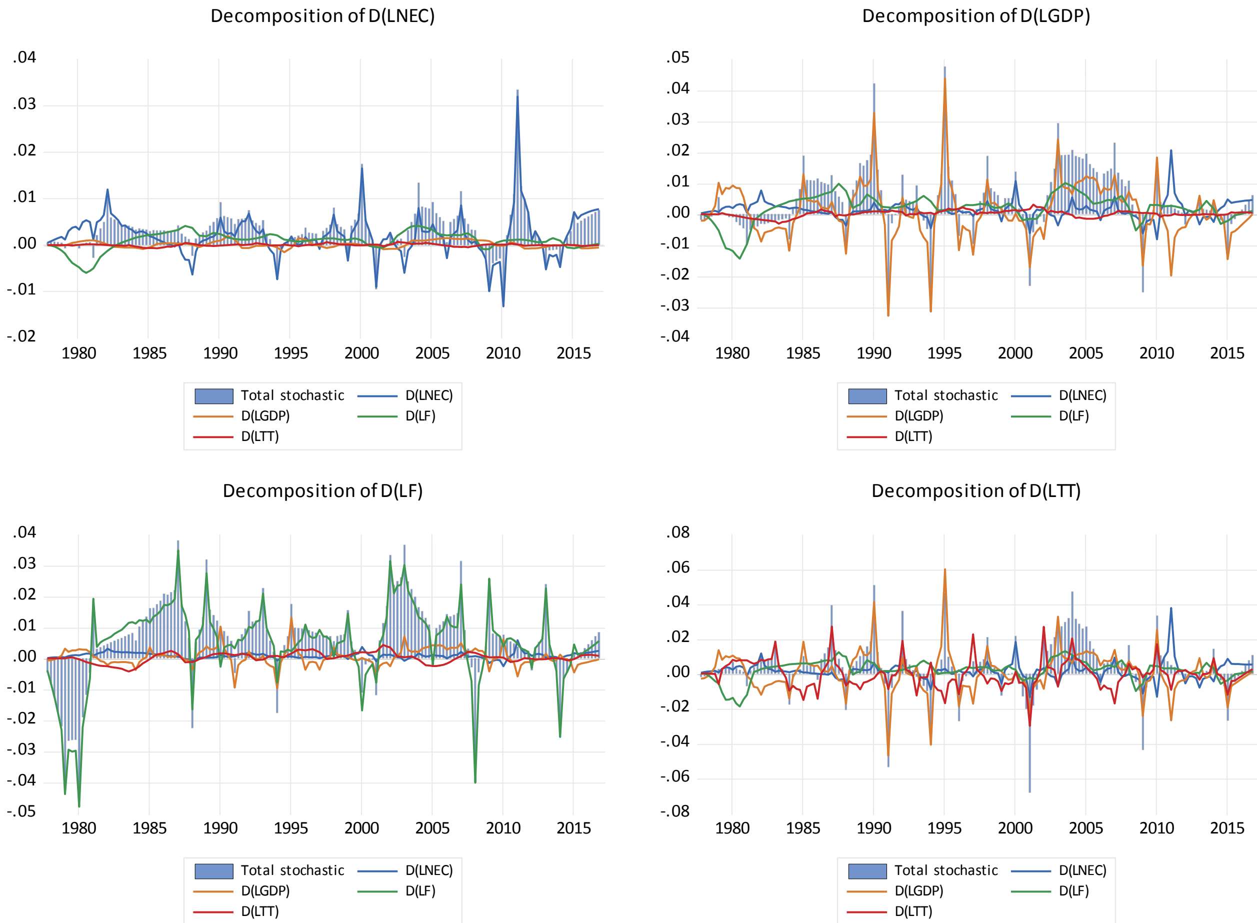

Fig. 2 Historical Decomposition using Cholesky (d.f. adjusted) weights.

Conclusion

The purpose of this paper is to examine the dynamic interaction between financial development, economic progress, energy demand and trade openness in North Cyprus. The ARDL bounds and Combined cointegration approaches are used to investigate the long-run and short-run dynamics among the concern variables. All variables are cointegrated based on both methods results. This is reporting the long-run relationship between financial development, energy demand, GDP and trade openness. Also, short-run disequilibrium and speed of adjustment observed by the error correction terms for all models (Eq. 9-12). The short-run disequilibrium is adjusted with the ECT_{t-1} and varying with 1-14 percent. The robustness of the ARDL results is confirmed with the Combined cointegration that verifies the same result of long-run equilibrium among variables. Also in this study impulse response used to check the responses of the variables. Innovations indicate that financial development and economic growth giving positive shocks to the energy demands. The positive responses of the energy demands are significant and persistence. Financial development is showing a just only positive response to the economic growth and itself in North Cyprus. GDP innovations are showing a positive response to the shock from both financial development and energy demands. Lastly, total trade is showing the positive and statistically significant response for all variables in North Cyprus.

In summary, the results are testifying long-run relationship between the variables. The novelty point of this study is the first attempt to investigate the dynamic relationship between the financial development and energy demands in North Cyprus. All the findings support the view that dynamically financial development, energy demands, economic growth and trade affecting each other with various techniques. Therefore, financial development improves economic growth and same time increase the energy demands in the country. Same like GDP responses positively to the financial development and energy demands in North Cyprus. While the financial depth which is an indicator for the financial development increase in the economy improves the economic progress with the energy uses. All the findings are in line with the past studies in the literature that financial development improves the economic growth with the energy uses.

References

Banerjee, A., Dolado, J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of time series analysis*, *19*(3), 267-283.

Bayer, C., & Hanck, C. (2013). Combining non-cointegration tests. *Journal of Time Series Analysis*, *34*(1), 83-95.

Bell, C., & Rousseau, P. L. (2001). Post-independence India: A case of finance-led industrialization?. *Journal of Development Economics*, *65*(1), 153-175.

Boswijk, H. P. (1994). Testing for an unstable root in conditional and structural error correction models. *Journal of econometrics*, *63*(1), 37-60.

Burbidge, J., & Harrison, A. (1985). An historical decomposition of the great depression to determine the role of money. *Journal of Monetary Economics*, *16*(1), 45-54.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Faisal, F., Tursoy, T., & Berk, N. (2018a). Linear and non-linear impact of internet usage and financial deepening on electricity consumption for Turkey: empirical evidence from asymmetric causality. *Environmental Science and Pollution Research*, *25*(12), 11536-11555.

Faisal, F., Tursoy, T., Gunsel Resatoglu, N., & Berk, N. (2018b). Electricity consumption, economic growth, urbanisation and trade nexus: empirical evidence from Iceland. *Economic Research-Ekonomska Istraživanja*, *31*(1), 664-680.

Faisal, Tursoy, T., & Resatoglu, N. G. (2016). Energy consumption, electricity, and GDP causality; the case of Russia, 1990-2011. *Procedia Economics and Finance*, *39*, 653-659.

Farhani, S., & Solarin, S. A. (2017). Financial development and energy demand in the United States: new evidence from combined cointegration and asymmetric causality tests. *Energy*, *134*, 1029-1037.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control*, *12*(2-3), 231-254.

Perron, P., & Vogelsang, T. J. (1992). Testing for a unit root in a time series with a changing mean: corrections and extensions. *Journal of Business & Economic Statistics*, *10*(4), 467-470.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy policy*, *38*(5), 2528-2535.

Sadorsky, P. (2011). Financial development and energy consumption in Central and Eastern European frontier economies. *Energy Policy*, *39*(2), 999-1006.

Shahbaz, M. (2013). Does financial instability increase environmental degradation? Fresh evidence from Pakistan. *Economic Modelling*, *33*, 537-544.

Shahbaz, M., & Lean, H. H. (2012). Does financial development increase energy consumption? The role of industrialization and urbanization in Tunisia. *Energy policy*, *40*, 473-479.

Shahbaz, M., Khan, S., & Tahir, M. I. (2013). The dynamic links between energy consumption, economic growth, financial development and trade in China: fresh evidence from multivariate framework analysis. *Energy economics*, *40*, 8-21.

Türsoy, T. (2017). Causality between stock prices and exchange rates in Turkey: Empirical evidence from the ARDL bounds test and a combined cointegration approach. *International Journal of Financial Studies*, *5*(1), 8.

Türsoy, T., & Faisal, F. (2018). Does financial depth impact economic growth in North Cyprus?. *Financial Innovation*, *4*(1), 12.