An Investigation on Financial Development, Trade Openness and Economic Growth: Var Approach

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Abstract: The aim of this analysis is to examine the impact on economic growth in Bahrain from 1986 to 2018 from FDs and trade openness. To investigate the data, the Vector Autoregressive Model (VAR) and the causality of Granger have been used. The results show that all vector lives are co-integrated at 5 percent meaningful levels in the long term. In the near term, economic growth will only be influenced by financial progress. The Granger Causality (CC) Test reveals the unidirectionality of global and financial developments. In this way, policymakers should advance FD and promote more free markets, in the end the aim is to increase economic growth.

Keywords: financial development (FD), trade openness (TO), economic growth (EG), VAR

INTRODUCTION

Financial and multinational business are the core of the economic structure (Ali, Bakar, & Omar, 2016; Ali, & Omar, 2016). The banking sector offers a wide range of services to the family units, companies and public sectors that have influenced economic development. A financial market that is available to all nations, including Bahrain, is efficient, supervised and competitive. Because of its effect on development policies, the connection between EG and FD is a large subject that has gotten a lot of attention in the literature and empirical evidence (Hasan, & Ali, 2019; HO, Pham, & Nguyen,2021).

Much analytical and observational study has been coordinated over the last decade to achieve a better understanding of the impact of TO and financial improvement on welfare levels and rates of GDP growth. The ties between TO and economic growth, as well as the links between FD and economic growth, have been the subject of many theoretical and analytical studies. Regardless about how much writing has been done on the subject of FD and economic growth, there is disagreement on the course and extent of the connections on the purported topic. The findings of several research on the relationship between the advancement of a nation's financial system and the size and rate of EGare mixed. Nonetheless, for two basic reasons, this scientific proof or observational verification appears to be questioned: To begin with, there are already debates and concerns about how countries' TO is calculated. Second, there is also some controversy on the econometrical methods used (Dollar and Kraay, 2004; Huchet-Bourdon, Le Moul, and Vijil, 2011; Huchet-Bourdon, Le Moul, and Vijil, 2018; Loayza, Fajnzylber, and Calderón, 2005; (Hasan, & Ali, 2019;Ali, Hasan, & Oudat, 2021). As topics of development and economics, the interconnection between financial trends and EGhas been debated (Hafnida, Maamor, and Abdullah, 2016;Ali, Hasan, & Oudat, 2021). The following are the five parts of this paper: The literature review is summarized in section two, while the details and parameters for the multivariate (VAR) model are presented in section three. In section four, the analytical reports and observations are discussed and evaluated. Finally, in section five, the article is summarized and closing comments are presented.

LITERATURE REVIEW

These methodologies, often utilized in analytical or methodological work, analyze trade-related literature, measure the impacts of TO, financial progress, and EGseparately TO and financial progress are often pursued independent of each other, while their effects on the economy's growth vary in degree and kind of increase in each time they occur. Then again, the second technique approaches trade liberalization is also looks at the relation between EG and financial progress. tools; First, there are two simple econometric methods: One is to use the sum of financial production and the degree of TO to measure economic growth, and the other is to do the reverse. There are two methods of problem expansion used: either multiple regression or regressions on the data

that expand the issue, depending on the complexity of the model. the majority of modern studies use the VAR and VEC models, but a new investigation or study is reviewing and exploring the other, alternative approaches. FD and TO are generally recognized as important components of economic growth. In either case, according to Altaee and Al-Jafari (2014), there is inconclusive or contradictory data due to the studies' use of nation-specific elements and techniques. As a result, a country-specific or explicit analysis backed by a well-developed methodology is worthwhile to explore. Altaee and Al-Jafari (2015), on the other hand, looked at the relationship between TO, financial progress, and economic growth. The results suggest that trade transparency and FD have an effect on economic growth, but that growth has no causal connection with trade and FD. Furthermore, the results indicate a short-run causality between financial growth and TO. The findings suggest that trade transparency and FD are critical factors in determining Bahrain's economic growth.

Saidi and Mbarek (2017) used panel data and parallel equations to examine the effects of financial growth, jobs, trade transparency, and urbanization on carbon dioxide emissions or outflows for a panel of emerging economies over the period 1990–2013. The findings revealed a positive monotonic relationship between income and CO2 emissions. The EKC theory, which suggests an inverted U-shaped relationship between income and environmental destruction, is not supported by any model. Financial growth has a long-term detrimental impact on greenhouse emissions, suggesting that it decreases environmental depletion. This means that financial growth should be used to conduct or enforce financial changes in order to prevent the economy from degrading (Ali, Bakar, & Omar, 2016; Ali, & Omar, 2016).

Over the period 1970 to 2014, Chandio et al. (2017) investigated the trajectory of causality between FD, TO, and EG in Pakistan. Statistical instruments such as the ADF and P-P unit root tests were used to verify the stationery of the sequence, and the co-integration test was used to evaluate the long run relationship between the variables for this project or effort. The GC method investigates the causal association between variables. The ADF test showed that after the first discrepancy, all variables became stationary, verifying the co-integration test. Furthermore, the findings of the Johansen co-integration test indicate that the stimuli or variables have a long-term relationship. The findings of the GC test, on the other hand, show that there is a bi-directional causality relationship between EG and financial progress. Meanwhile, the findings show that there is a bi-directional causality relationship between TO and financial growth. The findings revealed that there is a unidirectional causality link between trade transparency and economic development. It argues that FD and TO are crucial to improving economic growth. According to Hye and Lau (2015), was to establish a first-time TO index and use it to investigate the relationship between TO and EG in the case of India. For theoretical help, this analysis employs a modern endogenous growth model, an auto-regressive distributive lag model, and the rolling window regression process, with the end goal of determining the long run and short run relationship between exchange openness and economic growth. The GC test is then used to determine the long and short run causal path. In the long term, the effects of the TO index have a negative impact on economic development. The rolling window regression findings offer new data or confirmation that the effect of the TO index on EG is not constant across the study. The TO index is favorably linked to EG in the short term. The GC test findings affirm the short and long term relevance of the exchange openness-led growth and human capital-led growth hypotheses.

Altaee et al. (2014) investigated the impact of financial progress and TO on EG in a small and open region, the Sultanate of Oman, from 1972 to 2012. The unit root tests for stationarity, Johansen and Juselius (JJ) for co-integration in the VAR system, and the GC test for causal relationships were used in the study. Variance decomposition analyses (VDC) based on VAR effects are also computed. The GC test shows unidirectional causality from EG to FD, while empirical findings from VDCs indicate that TO shock is the most significant cause of shock to GDP and FD. Indicating one-way causality from exchange openness to the other two sequences. Shock to trade transparency is a major cause of variability on its own at first, but this self-effect disappears in a relatively small portion of the population. According to the findings of the study, international policies aiming at increasing TO have a statistically important effect on FD and economic growth. Rahman, Shahbaz, and Farooq (2015) analyzed the interdependence of financial progress, international trade, and EG in Australia from 1965 to 2010. The ARDL bounds checking approach to co-integration was used to analyze the series' long run relationship, whilst the stationarity properties of the variables were evaluated using two structural split checks, namely Zivot-Andrews (1992) and Clemente et al (1998). Our observational evidence supported the variables' long-run relationship. The results showed that financial progress, international trade, and capital are the pillars of global growth in both the short and long term. International trade and global activity have a feedback impact. In the case of Australia, financial progress granger causes economic growth, thus validating the supply-side theory. Similarly, Satyanarayana Murthy, Kumar Patra, and Samantaraya (2014) investigated the inter-relationship and trajectory of causality among three macroeconomic variables: trade liberalization, financial progress, and economic growth. The findings confirmed that there is a long-run correlation between TO, FD, and economic growth. This research also discovered bidirectional causality between FD and growth. However, the causality that runs from growth to finance is greater than the causality that runs from finance to growth. This research also found unidirectional causality running from FD and EG to TO.

Alkhuzaim (2014) studied the long run relationship and path causality between financial changes and EG in Qatar from 1990 to 2012 using the co-integration and GC approaches. According to the results, there is a long-run favorable equilibrium between all FD metrics and economic growth. In the long term, the causality test shows unidirectional causality from domestic credit to GDP. However, in the short run, the findings show unidirectional causality from GDP to domestic credit provided by the banking sector.

Musamali, Nyamongo, and Moyi (2014) examined the relationship between financial stability and EG in 50 African countries from 1980 to 2008. There were two proxies for FD: the domestic credit-to-private-sector-to-GDP ratio and the general money-to-GDP ratio. The findings showed a favorable association between FD and economic growth. Regardless, the correlation between domestic credit and private sector and EG was much greater than the link between large money and economic growth. Furthermore, there was a bidirectional relationship between the financial sector and economic growth.

Rehman, Ali, and Nasir (2015) investigated the relationship between FD and EG in Bahrain from 1981 to 2013. As a tool, they used the co-integration test and the VAR structure. For Bahrain, the findings do not accept either the supply-driven or demand-following hypotheses.

Ho and Njindan Iyke (2018) extended a recently proposed TO index to a panel data environment in order to investigate the short- and long-term effect of TO on financial growth for a panel of 43 Sub-Saharan African countries from 1996 to 2014. According to research, TO promotes long-term FD. However, in the short term, the effect of openness is unclear but appears to be negative. When the researchers split the sample into low- and middle-income classes, they discovered that transparency promotes financial growth in the former but hinders it in the latter. This suggests that the relationship between financial growth and transparency is not linear. According to Keho (2017), the relationship between TO and economic development has been extensively studied, producing mixed and ambiguous performance. This could be explained by the exclusion of capital stock and labor from the trade-growth nexus. He examined the impact of TO on EG in Cote d'Ivoire from 1965 to 2014 using a multivariate method that used capital stock, labour, and TO as regressors. It employs the Autoregressive Distributed Lag Bounds test and the Toda and Yamamoto GC tests for co-integration. The results found that TO has a favorable impact on economic development in both the short and long term. Furthermore, they demonstrate a favorable and clear complementarity between TO and capital accumulation in fostering economic development.

FD is widely regarded as critical drivers of EG (Oudat, & Ali, 2021). However, there is inconclusive proof based on some writings due to country specific conditions and various approaches used for the studies (Hasan, & Ali, 2019). As a result, a country-specific analysis backed by a well-developed approach is worthwhile to attempt. The current research contributes to the existing literature by providing empirical evidence on the relationship between FD, TO, and EG in Bahrain.

METHODOLOGY

The current paper is based on observational research and only looks at four factors. Gross domestic product, financial growth, TO, and inflation were the variables used. All variables in Bahrain are based on time series data from 1986 to 2018. In this analysis, the estimation equation will be used.

$$\text{GDP}_t = \beta_0 + \beta_1 \text{FD}_t + \beta_2 \text{TO}_t + \beta_3 \text{INF}_t + \varepsilon_t \qquad (1)$$

The unit-root test, GC, co-integration, and Vector Autoregressive Model will all be used in this analysis (VAR). The non-stationary test for each element is calculated using the unit root test. By using Augmented Dickey Fuller, we must teach each of the series in the levels and first distinction (ADF). If this stationary test is important, the variable series is stationary and the unit root test is not applicable. As a result, the null hypothesis will be dismissed, while the alternative hypothesis will be accepted (Trung and Vinh, 2011). If the stationary test is negligible, the variable has a unit root test, and the null hypothesis is acknowledged. This test's conclusion is as follows:

$$H_0 : \theta = 0 \text{ (not stationary)}$$
$$H_1 : \theta \neq 0 \text{ (stationary)}$$

We will go on to the co-integration test after we've figured out what each variable's stationary degree is. The long-run relationship between both variables is investigated using the co-integration measure (Pedroni, 2004). Assume the following VAR levels, where Y t stands for growth, government spending, financial progress, TO, and GDP:

$$Y_t = c + \sum_{i=1}^{k} \Gamma_i \Delta Y_{t-i} + \theta_i \qquad (1)$$

The VAR in Eq. (1) is not stationary if the variables in Xt are I(1). The difference of the series can be calculated based on that condition, and a first difference of VAR of such equations can be estimated.:

$$\Delta Y_t = c + \sum_{i=1}^{k} \Gamma_i \Delta Y_{t-i} + \theta_i \qquad (2)$$

The stationary variable is raised by the integration parameter. As a result, the VAR in Eq. (2) can be written as follows in this case.:

$$Y_t = c + \sum_{i=1}^{k} \Gamma_i \Delta Y_{t-i} + \Pi Y_{t-1} + \theta_i \qquad (3)$$

In equation 3, II is a rank r matrix that can be divided as

$$\Pi = \gamma \rho^! \qquad (4)$$

Where is a three-dimensional (3 x p) loading matrix and is a three-dimensional (3 x rp) matrix of co-integrating vectors, and p is the number of co-integrating vectors. According to Ighodaro (2010), the number of co-integrating vectors was determined by using VAR in equation 3 for the Johansen protocol.

The next step is to use the GC test to establish the causal association between two variables (Engle and Granger, 1987). If the p value of a variable Y has a major effect on the value of another variable X, so Y and X have a granger causal relationship. The GC test equation is as follows:

$$Y_i = \alpha_0 + \sum_{j=1}^{k} \alpha_j Y_{t-j} + \sum_{m=1}^{n} \delta_m X_{t-1} + \varepsilon_t \qquad (5)$$

$$X_i = \beta_0 + \sum_{j=1}^{k} \beta_j X_{t-j} + \sum_{m=1}^{n} \rho_m Y_{t-1} + \theta_t \qquad (6)$$

The evaluated variables are Y (i) and X (i), the time interval is t, the number of lags is j and m, and the error words are _t and _t. For all m, the null hypothesis is _m= m=0. Meanwhile, if the coefficient _m is important but _m is not, the alternative explanation that _m0 and _m0 for at least some of m implies that the X is a greater cause of the Y. If both are important, though, there would be bi-directional causality.

Findings
Unit Root test results
The findings suggest that all of the variables measured are not important at the level, implying that they have a unit root test and are not stationary for both constants with and without patterns. As a result, the variables are evaluated at the first variance, and the results show that the variables do not have a unit root or are stationary in constant and constant with pattern (see Table 1.1).

Table 1: Unit Root Test

Variables	Constant		Constant + trend	
	Level	First difference	Level	First difference
GDP	-5.3685*** (0.0001)	-6.3716*** (0.0000)	-5.8589*** (0.0002)	-6.2524*** (0.0001)
FD	-0.5739 (0.8629)	-5.5424*** (0.0001)	-3.3466* (0.0770)	-5.4066*** (0.0006)
INF	-2.1766 (0.2183)	-10.6393*** (0.0000)	-3.0517 (0.1358)	-4.9430** (0.0022)
TO	-2.8048* (0.0688)	-6.3516*** (0.0000)	-2.8908 (0.1785)	-6.2455*** (0.0000)

Lag Length Selection Test
The best lag length was chosen using a piloted lag length selection test. The Schwarz Information Criterion (SC), Hannan-Quin Information Criterion (HQ), Final Estimation Error Criterion (FPE), and Akaike Information Criterion are the four methods used (AIC). Since AIC is the most commonly adopted solution of all, the lag duration chosen was 1. Then we can do the Johansen co-integration test.

Table 2: Lag Selection Test Result

LAG	FPE	AIC	SC	HQ
0	83835.03	22.68802	22.87306	22.74834
1	13837.25*	20.87526*	21.80041*	21.17684*
2	18269.45	21.09573	22.76100	21.63856

Johansen Co-integration Test
Since all of the variables are stationary, the co-integration of the variables may be examined. To see if there is co-integration with long-run relationships, the Johansen Co-integration was used. The results of the Johansen co-integration are seen in Table 1.3. To evaluate if a long-run interaction occurs under the null hypothesis, the trace statistic as well as the max-Eigen statistic should be higher than the critical value. According to the table,

both the maximum-Eigen statistic and the trace statistic are present in the Bahrain economy at a 5% level among the four variables. It shows that both factors have a long-term relationship with one another (Altaee & Al-Jafari, 2015; Rahman, Shahbaz & Farooq, 2015; Hafnida, Maamor & Abdullah, 2016; Chandio et al., 2017).

Table 3: Johansen Co-integration test

Rank	Max-Eigen Statistic	Critical Value (Eigen) at 5%	Trace Statistic	Critical Value (Trace) at 5%
None*	31.72485	27.58434	57.29946	47.85613
At most 1	16.12880	21.13162	25.57461	29.79707
At most 2	7.999131	14.26460	9.445809	15.49471
At most 3	1.446679	3.841466	1.446679	3.841466

VAR Results

The use of VAR to analyze the short-run relationship between financial progress, trade transparency, and EG is important. The VAR test results are shown in Table 1.4. The findings showed that only financial growth has a major effect on GDP in the short term, according to the table. Meanwhile, in the short term, TO and inflation have little impact on GDP.

Table 4: VAR results

Variables	GDP	FD	INF	TO
GDP	-	0.3524 (0.3316)	0.0162 (0.8309)	0.0147 (0.9780)
FD	-0.0845* (0.0805)	-	0.02576 (0.1503)	0.1200 (0.3364)
INF	0.1871 (0.7466)	1.4063 (1778)	-	-0.2971 (0.8453)
TO	-0.0470 (004683)	0.0163 (0.8869)	0.01584 (0.5121)	-
C	10.2803*** (0.0008)	0.0900 (0.9852)	-0.1475 (0.8850)	0.2477 (0.9725)

Granger Causality (GC)

The GC test is used to determine if the two factors have a causal link. If the F-statistic for is less than the F-critical, no granger trigger exists between the two variables. The findings of the Pairwise test for GC are shown in Table 1.5. The results revealed a one-way causality between financial growth and GDP. It is also confirmed by Alkhuzaim (2014), who discovered a one-way causality between financial growth and GDP.

Table 5: Granger causality (GC)

Null Hypothesis	Obs	F-statistic	Prob.
FD Granger isn't responsible for anything. GDP	31	2.62511*	0.0915*
GDP Granger isn't responsible for anything FD		0.55971	0.5781
INF Granger isn't responsible for anything GDP	31	0.52891	0.5954
GDP Granger isn't responsible for anything INF		2.45517	0.1055
TO Granger isn't responsible for anything GDP	31	0.48249	0.6227
GDP Granger isn't responsible for anything TO		0.88214	0.4259

CONCLUSION

The economic structure is heavily influenced by FD and TO. In the meantime, TO mitigates technical and information spillovers, all of which are essential for improving health and EG (Ho & Njindan, 2018). Using data from 1986 to 2018, the aim of this research is to look into the effects of financial progress and TO on EG in Bahrain. The results showed that there is a long-run association between all variables using the VAR method and co-integration test. Only FD affects economic activity in the near term. From financial progress to economic growth, there is unidirectional causality. As a result, policymakers must ensure financial stability and encourage bilateral and multilateral trade in the productive sector of the economy. As a result, the study's analytical findings indicate that financial progress and trade transparency are crucial ingredients in accelerating Bahrain's economic growth. The central bank should quicken the pace of financial growth and retain the system's best practices. More effort must be made to expand the country's range of foreign trade. Accelerated trade liberalization with the GCC nations, combined with lower trade barriers with other countries, would make the country's economy expand faster.

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