Dynamic Relationship among Effective Supply Chain Practices, Income, Exchange Rate, Foreign Direct Investment, and Export Performance

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***Abstract* - This study has an effort to explore the dynamic relationship among income, exchange rate, foreign direct investment, effective supply chain practices and export performance. Based on quarterly data from Q2/2009 to Q4/2019, constituting 43 observations. To attain dynamic and unvarying relationship among these variables, applying Vector Autoregressive Model, results indicate that, in short run, each variable is highly influenced by changes of value and past value of its and the other variables at different degree. In addition, there does not exist a long run association among exchange rate, income, foreign direct investment and export in Vietnam in the research period.**

Keywords; *Supply chain practices, Vector auto-regression (VAR), Exchange rate, Income, Foreign, Export*

1. Background

In the context of global economic integration, enhancing international trade from the host countries to the rest of the world has been such a major role in promoting economic performance, productivity expansion, and joining global value chains [8]. Moreover, the effective implementation as well as the execution of the practices of supply chain management for the improvement in international trade has a matter of great interest among researchers. Besides, the least and developing countries are lack of capital, highly skilled human capital, and knowledge, technology to boost international trade by increasing competitive advantages for domestic goods and services [21]. The efficient supply chain management practices encourage international trade especially exports as they enhance the competitive advantages for the inland products and services by improving the quality of technology, logistics, resources, and production. The researchers Ling-yee and Ogunmokun [22] are of the view that the effective strategies and practices of supply chain management prove to have great significance in the achievement of superior export performance. Supply chain management improves the performance of the country's exports with the provision of a sound information system, remarkable communication network, transportation, and flexile marketing channels [15]. This study has been conducted to measure the contribution of efficient supply chain management strategies and practices to the rate of export performance.

Local firms in the host countries need to enhance their production abilities and production efficiency to support international trade [26]. In these firms, the strategies and practices of supply chain management are being implemented and executed to raise production level and competitive advantages in international trade. The appropriate undertaking of supply chain management practices enhances productivity and production efficiency as it improves the speed of production procedures and the quality of technology as well as the production of goods and services [7]. The efficient practices of supply chain management with sound collaboration among the nodes, at the national and international level, creates knowledge and awareness of changing market requirements, customers' preferences, and changes in the technology [16]. In this way, these practices enable the firms' to raise the level of demands for the domestic goods and services in the international market meeting the requirements of innovativeness in the quality of goods and services, as per the shifts in business and market environment at international level. The influences of the strategies and practices of supply chain management on the export performance of the country's economy have widely been researched and discussed by the scholars Kaur, Sambasivan [18]. The research proves that effective interrelationships among the business organizations, at the national as well as international level, due to efficient supply chain management contribute much to the performance of exports [5].

In the trends of attracting foreign investment in the host countries, it is very important to note that most countries

need to foster an adapted policy that will easily attract foreign investment. In particular, this mechanism can encourage foreign investment via cooperatives in infrastructure, energy, and renewable [2]. This efficiency is further generated knowledge transfer, skill development, and connected multilateral. It can generate positive export performance by increasing in export-oriented industries to enhance advantages of preferential ways for the least and developing countries and promotes for development assistance [28]. The efficient strategies and practices of supply chain management increase the number of export-oriented industries in the country providing them with convenient and flexible ways of dealing through a proper communication network and fast as well as eco-friendly transportation. In emerging countries, the efficient supply chain management practices create competitive advantages for domestic products and services and improve export performance [12].

Vietnam is currently of the most emerging countries with such a great achievement in Asia regarding foreign investment, per-capita income, and export promotion with the implementation of efficient practices of supply chain management. By the end of 2019, Vietnam had attracted approximately 30.000 foreign projects with the capital of 362 billion USD from 135 countries and territories. According to these arguments, the paper aims to estimate an influence of income, exchange rate, direct investment in foreign institutions, and export in the case of Vietnam. This paper also intends to examine the influences of efficient practices of supply chain management on export performance. The methodology will apply Vector Auto-regression (VAR) to answer this aim. The paper has proceeded as follows, Section 2 presents the literature review while data collection and methodology development in Section 3. Section 4 describes findings and discussions, and then conclusions in Section 5.

2. Hypotheses development

Recent studies indicate that the impact of three factors such as income, exchange rate, foreign direct investment on export has been analyzed and the results are quite complicated depending on the situations and research time. Recent research by [11] has also proved that efficient supply chain management strategies and practices impart a considerable influence on the rate of export performance. As shown in [9], lots of research have been focused on the linkage between the exchange rate and export performance. Applying quarterly panel data covering from 2006 to 2017 in the Chinese emerging economy, results indicate that the exchange rate in the present time can restrain exports in the next period in the inter provincial level. Furthermore, financial marketization could promote negatively on exchange rate changes that affect exports [14]. Therefore, China needs to accelerate to reform financial marketization in order to balance development across regions. While the implementation of the practices of supply chain management improves the country's export performance and guarantees the achievement of superior export performance in the future [4]. The efficient practices of supply chain management clear several ways for the promotion of export performance. It increases productivity and competitive advantages for domestic goods and services in international markets [29]. Supply chain management practices enable the export-oriented industrial organizations to bring improvement in the operational and production procedures, the technology used for production, and marketing techniques, that lead to superior export performance. The business organizations which are active in implementing and executing the efficient practices of supply chain management have more contribution to the country's export performance [19].

The recent studies Vanalle, Ganga [25] shed light on the point that the undertaking of efficient supply chain management practices help to create exports as well as bring improvement in the country's export performance as efficient supply chain management provides effective information system. Within the supply chain, an appropriate and strong communication network is established among the chain nodes that considerably lead to the transformation and sharing of information [17]. Recent research has proved that efficient information sources are used to collect valid as well as beneficial information. The opportunity to use the up-to-date technology within the supply chain facilitates the collection of in time, adequate, appropriate, and valid information. It has widely been argued by scholars that efficient supply chain management practices provide information about the market trends and requirements even at the international level. Moreover, the export-oriented industries, having efficient supply chain management, become aware of the market shifts, and perform activities to promote export performance accordingly [10].

As suggested in Wang, Wen [27] on a study by applying new aggregate regression in agreement with two-way trade flows as well as by gravity equation. Theoretically, the aggregation method leads to an unbiased analysis in the case when the prices of products are assigned in the form of generally accepted currency in international market to agree with the dominant currency paradigm. Further investigated by using Monte-Carlo simulations, results indicate that biases are limited at approximately 1% for the exchange rate and greatly huge at approximately 10 percent for demand elasticity. Besides, [6] reaffirmed that the difference of elasticity between using estimated methods such as bilateral, and

aggregate levels will reduce related to apply ideal REER regression. Similarly, [24] on a study covering from 1994 to 2017 in China how fixed exchange rate affects export-led growth. The case of China, this economy has much experience greater rates of growth in productivity in tradable than the products and services that are non-trable, therefore fixed exchange rate can negatively affect the Balassa-Samuelson effect inconsistent with a nominal rigidity in wage adjustments. In particular, the undervaluation policy in China can enhance the increasing of tradable industries and greater achievement in export-led growth.

According to renowned scholars, [20], the implementation and execution of the practices of supply chain management facilitate the quality and speed in the production of domestic goods and services. The relationship with the suppliers facilitates the procurement of higher quality material that further improves the quality of products to be exported to foreign countries. Within the supply chain, up-to-date technology is likely to be used for the achievement of innovation and superior quality in the production of goods and services. Efficient supply chain management improves the quality of products by the efficient integration of resources and production procedures [13]. The implementation and integration of supply chain management practices bring agility in the production procedures and thus leads to a higher rate of increment in productivity. The technology, in time information acquisition, and better transportation increase the manufacturing of goods and services. The improvement in the quality and quantity of products with the implementation of efficient supply chain management practices leads to an improvement in the rate of export performance [3].

Regarding China's exchange rate policy and its influence on trading partners by using the GVAR model, [1] has conducted on a sample data of thirty countries, such as six high-income economies, six middle-income economies, and eighteen low-income economies in the period of 1992 to 2017, results depict that China's Yuan has a trend of undervaluing in the research period compared to other trading partners, therefore, undervaluation negatively affects trading partners' income, but stimulates exports, and reduces imports in China. In the partners of China, this effect is adverse because of an increase in their incomes but also increase their exports to China.

In the study in Japan from 1995 to 2014, [23] using techniques of spatial econometrics that are expected to reduce the biases of neglected effects. Results demonstrate the interesting evidence that spatial configuration has evolved in the last two decades in Japan. This economy has greatly exported to their partners with a higher level in political stability and economic integration, and the economies with greater foreign direct investment outflows from Japan. Besides, Japan has significantly exported with economies that depend on Japanese imports and with lower-incomes countries than Japan. This trend can be explained that Japan has a policy of increasing its exports to East Asian, EU, and North American economies.

3. Methodology

About the methodology, to test the association among gross domestic product, exchange rate of VND/USD, foreign direct investment, effective supply chain practices and export, the Vector Auto-regression (VAR) model should be applied in this method of research. As per the model, each variable is regarded as internally developed and such variable is discussed by its past as well as lagged values and such past values of all other variables comprised in the model. There are no external variables included in the concerned model and thus, by having ignored the pervious restriction that was imposed this model. the VAR considerably contributes to the flexible nature of the model. The VAR proves to be useful for forecasting systems of interconnected time series and for examining the remarkable influences of unexpected disturbances on the set of variables. The VAR avoids the necessity of structural modeling by preparing a model of every internal variable in the system as a function of the past values of all the concerned variables.

The VAR's methametical form is $y_t = \beta_1 y_{t-1} + \beta_2 y_{t-2} + ... + \beta_p y_{t-p} + \gamma x_t + \varepsilon_t$, where yt is a k vector of endogenous variables;xt is a d vector of exogenous variables; $\beta_1, \beta_2, ..., \beta_p$ and γ are sets of coefficients that must be measured; and ε_t is a vector of innovativeness that may be connected with one another in the same period of time but that vector of innovativeness may be un-related with their own past lost values and unrelated with all the right side variables. Because only prior lost values of the internal variables appear on the right side of each equation, the existence at the same time does not much matter, and OLS is the technique of estimation.

The study has taken the market price of USD in VND from https://vn.investing.com, the Vietnam macro indices, including income, foreign direct investment, and export from https://finance.vietstock.vn/. This study takes the ratio of time taken by supplier and time allowed to supplier as the measurement of effective supply chain practices. The studied data covers from Q2/2009 to Q4/2019, constituting 43 observations. In these series, some of the data is missing because of the occurrence of holidays and some other issue. It is also possible that these data were neglected to be recorded

while using Microsoft Excel to handle the data. The variations on indexes are measured by considering difference of two consecutive days, i.e. $V_t = P_t - P_{t-1}$ where Pt is the price of a single financial asset at a particular time t.

Table 1. Measurement of variables used in the study

Variables	Abbreviation	Source
VND/USD	EXR	State bank of Vietnam
Income (billion VND)	GDP	Department of Statistics
Disbursement foreign direct investment (billion USD)	FDI	
Export (million USD)	EXPORT	
Effective supply chain practices (Ratio of time taken by supplier and time allowed to supplier)	ESCP	WDI

4. Results

A stable time series proves to be highly considerable to the regression examination of the values based on time series, as useful information or values are difficult to recognize an unstable time series. That is why, an unstable time series may cause a stray regression. Well, it is the other that the economic time series are mostly unstable in practical field. So, there should be made stable time series noting and removing the differences. Useful values become still possible to be recognized in the time series taking and removing differences. A time series can be stable if its mean and variance are constant and, the co-variances are dependent upon the distance of two periods of time.

The unit root test should be applied to examine the stability of concerned variables and the degree of collaboration. The Augmented Dicky-Fuller unit root test (ADF) is frequently applied in this regard. For the VAR analysis each construct of the model must be stable. The consequence of ADF estimation has been shown with lag 4 suggested by Newey-West, including trend and intercept in test equation. Table 2, and 3, respectively, present ADF tests for series at level and at the first difference.

Table 2. ADF test results for data at level

Null Hypothesis:	t-Statistic	Prob.	Conclusion
GDP has a unit root	-1.592624	0.7772	Non-station
FDI has a unit root	-1.44771	0.8299	Non-station
EXPORT has a unit root	-2.33272	0.4071	Non-station
EXR has a unit root	-2.26431	0.4420	Non-station
ESCP has a unit root	-1.32541	0.5412	Non-station

Table 3.ADF test results for data at first difference

Null Hypothesis:	t-Statistic	Prob.	Conclusion
D(GDP) has a unit root	-3.829718	0.026	Station
D(FDI) has a unit root	-4.169414	0.0115	Station
D(EXPORT) has a unit root	-3.935675	0.021	Station
D(EXR) has a unit root	-3.546963	0.045	Station
D(ESCP) has a unit root	-4.325418	0.021	Station

The unit root test considering prior difference and is is indicated by the results drawn that most of the data series are unstable at the initial stagel but they become constant after taking and removing the prior difference. In the same way, the data series are I(1) that represents the integration of time series at the level of early difference.. Figures 1 as well as 2 advocate this. Two advantages are availed while applying the initial difference data series to analyze and discuss the degree of response function. At first, it addresses the increasing or decreasing tendency instead of the actual alteration. As the initial difference data series shows the increasing or decreasing tendency in every consecutive time interval, the power of the trend can be checked by the impulse response function. On the other hand, this deals with more values on the change in the prices of gold as the initial difference data represents relative change in two consecutive days but the level data represents change in a single day.

One of the important aspects of VAR model is to choose the most previous term. The typical method of choosing the lag length is to remodel VAR by minimizing the time interval of lag length from highest point to least point. In each model, the least characteristics of the Akaike criterion and the Schwarz criterion should be taken to choose the maximum time interval of lag [18]. In this study however, five criteria: LR modified in proper arrangement examine statistics (LR), Final prediction error (FPE), criterion (AIC), Schwarz criterion (SC) and Hannan-Quinn criterion (HQ). Similarly, the smallest value of these 5 criteria points to the optimal lag length. Table 4 shows the summary results of VAR lag order selection criteria.

Table 4. VAR lag order selection criteria

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1105.6	NA	6.962	61.645	61.821	61.707
1	-1064.8	70.30	1.772	60.266	61.146	60.573
2	-1030.8	50.98	6.74	59.26	60.85	59.81
3	-987.73	55.0*	1.6*	57.76	60.0*	58.5*
4	-975.37	13.04	2.432	57.965	60.956	59.009
5	-965.72	8.038	4.90	58.318	62.013	59.607
6	-935.80	18.28	4.21	57.5*	61.943	59.080
* indicates lag order selected by the criterion						

The length of lag is shown by the model in the indicated by the first column at the left side of the table. Here, FPE, LR, HQ, AIK, and SC has been taken under consideration for the measure of lag length. The numbers shown here are the least characteristics under each criterion. While choosing the lag length, one should take into account the point that the least characteristics of lag length in VAR approach may be unable to capture the critical core conduct of the construcyts. Table 4 presents VAR Lag Order Selection Criteria. On the basis of consequences, the paper will select three lags to be efficient.

The results in previous subsection suggest us to use VAR model with lag three in the estimation. So, we have found the truly relationship between exchange rate and the concerned stock market index thanks to VAR Estimation in Table 5.

Table 5. VAR estimation result

	D(EXPORT)	D(EXR)	D(FDI)	D(GDP)	D(ESCP)
D(EXPORT(-1))	-0.137521	-0.010664	0.000110	24.44063	2.241532
	(0.21195)	(0.03124)	(5.2E-05)	(7.68285)	(0.36252)
	[-0.64882]	[-0.34131]	[2.10926]	[3.18120]	[6.15319]
D(EXPORT(-2))	0.080262	-0.021212	-5.36E-05	25.10276	3.25148
	(0.25509)	(0.03760)	(6.3E-05)	(9.24642)	(0.39541)
	[0.31464]	[-0.56411]	[-.85518]	[2.71486]	[8.22306]
D(EXPORT(-3))	0.101975	0.042160	5.07E-06	-18.48058	4.32561
	(0.25478)	(0.03756)	(6.3E-05)	(9.23533)	(0.43256)
	[0.40024]	[1.12252]	[0.08095]	[-2.0010]	[9.9997]
D(EXR(-1))	1.155109	0.172890	0.000366	35.97619	4.95124
	(1.20208)	(0.17720)	(0.00030)	(43.5726)	(0.59642)
	[0.96092]	[0.97568]	[1.23782]	[0.82566]	[8.30159]
D(EXR(-2))	0.082614	0.144248	-0.000213	-33.84342	6.14842
	(1.27974)	(0.18865)	(0.00031)	(46.3875)	(1.25413)
	[0.06455]	[0.76464]	[-.67752]	[-0.7295]	[4.90253]
D(EXR(-3))	-0.984365	0.029117	-0.000299	-42.68728	2.14512
	(1.21232)	(0.17871)	(0.00030)	(43.9435)	(1.65214)
	[-0.81197]	[0.16293]	[-1.0047]	[-0.9714]	[1.29838]
D(FDI(-1))	32.47964	71.35180	-0.687097	-53211.47	5.12471
	(802.684)	(118.324)	(0.19728)	(29095.3)	(0.95412)
	[0.04046]	[0.60302]	[-3.4829]	[-1.8288]	[5.37113]
D(FDI(-2))	-1237.401	-79.67991	-0.462305	-93398.41	6.35214
	(878.809)	(129.546)	(0.21599)	(31854.7)	(1.95841)
	[-1.40804]	[-0.61507]	[-2.1404]	[-2.9320]	[3.24351]
D(FDI(-3))	-80.87819	-37.42335	-0.001783	-17332.01	4.12541
	(777.028)	(114.542)	(0.19097)	(28165.4)	(0.98521)
	[-0.10409]	[-0.32672]	[-0.0093]	[-0.6153]	4.18734
D(GDP(-1))	-0.012177	-5.82E-05	-8.76E-07	-1.090246	3.56987
	(0.00223)	(0.00033)	(5.5E-07)	(0.08067)	(0.92148)
	[-5.47155]	[-0.17756]	[-1.6010]	[-13.515]	[3.87406]
D(GDP(-2))	-0.011265	-0.000186	5.42E-08	-0.863787	-2.95124
	(0.00374)	(0.00055)	(9.2E-07)	(0.13575)	(1.95241)
	[-3.00805]	[-0.33709]	[0.05885]	[-6.3633]	[-1.51158]
D(GDP(-3))	-0.005206	-0.000580	-4.74E-07	-0.647657	5.69835
	(0.00326)	(0.00048)	(8.0E-07)	(0.11812)	(0.95218)
	[-1.59749]	[-1.20720]	[-0.5916]	[-5.4829]	[5.98453]
D(ESCP(-1))	0.32541	4.19358	15.95813	-0.92541	9.36251
	(0.21451)	(0.65841)	(5.26351)	(0.25419)	(4.3251)
	[1.51699]	[6.36925]	[3.03184]	[-3.6372]	[2.16469]
D(ESCP(-2))	5.65249	3.95624	19.2541	-2.92549	4.12854
	(0.93652)	(1.95368)	(4.98612)	(0.56281)	(1.93816)
	[6.03563]	[2.02501]	[3.86154]	[-5.1980]	[2.13013]
D(ESCP(-3))	3.21451	4.96358	17.24156	-3.95864	5.95472
	(0.65341)	(1.93684)	(4.36982)	(0.95381)	(2.1954)
	[4.91959]	[2.56272]	[3.94559]	[-4.1503]	[2.71236]
C	2050.226	75.68452	0.117210	73690.74	64259.95
	(601.394)	(88.6518)	(0.14781)	(21799.1)	(22541.31)
	[3.40913]	[0.85373]	[0.79300]	[3.38046]	[2.85076]

Impulse response functions and variance decompositions are carried out to examine how shock to the variables bounce back through the system. Before carrying out these analyses, it is important to ensure that the VAR model is stable. We use the AR Root Graph as in Figure 1.

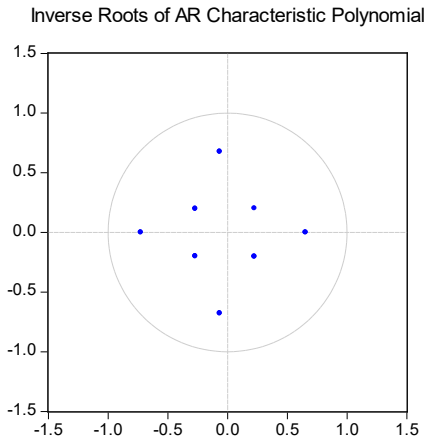

Figure 1. Inverse roots of AR characteristic polynomial

In Figure 1, the model satisfies the stability condition, as there are no roots lying outside the unit circle in the model. Besides, the residual serial is indeed white noise thanks to VAR Residual Serial Correlation LM Tests, with result in Table 6.

Table 6. VAR residual serial correlation LM test

VAR Residual Serial Correlation LM Tests		
Null Hypothesis: no serial correlation at lag order h		
Lags	LM-Stat	Prob
1	10.90903	0.8151
2	13.32278	0.6490
3	11.82961	0.7556
4	16.81218	0.3979
5	8.158832	0.9440
6	5.386216	0.9935
Probs from chi-square with 16 df.		

Impulse Response Function (IRF) track the response of each variable to innovations in each of the other variables. We can examine the magnitude, direction, and length of time that each variable is affected by a shock of a variable in the system, keeping all the other variables constant.

The results indicate that each variable is positively affected immediately by itself on right the first quarter. There is a common feature is that all effects of each variable on itself and the other variables disappear after a quarter. Exchange rate shocks have negative impact on import activities on the first quarter and keep effects from the following day until a year pass. While FDI and GDP both have no impact immediately on export, but they have positive impact on export after a quarter. The same rhythm holds for the shocks of EXPORT, FDI, ESCP and GDP on exchange rate and exchange rate on FDI. Another template is that a shock has no impact immediately on another variable, but it has negative impact on that variable after one or two quarters. This is true for the situation of shocks of EXPORT, GDP on FDI, shocks of EXPORT, FDI on GDP. Another scenario is the over low impact as almost no impact of exchange rate on GDP. The intensity of response can be seen from Variance Decomposition in Table 7.

Table 7. Variance decomposition

Variance Decomposition of D(EXPORT)						
Period	**S.E.**	**D(EXPORT)**	**D(EXR)**	**D(FDI)**	**D(GDP)**	**D(ESCP)**
1	1494.73	100.00	0.00	0.00	0.00	0.00
2	1705.60	80.98	5.01	0.06	13.94	5.14
3	1752.10	79.08	5.12	1.44	14.36	5.32
4	1857.94	71.44	6.01	7.16	15.39	6.25
5	2149.24	75.46	5.18	7.62	11.75	5.14
6	2303.67	68.52	5.33	6.73	19.42	5.36
7	2374.34	68.39	6.05	6.38	19.19	6.32
8	2441.58	64.73	6.04	8.18	21.05	6.98
9	2653.72	67.95	5.68	8.47	17.91	5.47
10	2808.60	62.66	5.60	7.79	23.94	5.34
Variance Decomposition of D(EXR):						
Period	**S.E.**	**D(EXPORT)**	**D(EXR)**	**D(FDI)**	**D(GDP)**	**D(ESCP)**
1	220.34	1.78	98.22	0.00	0.00	0.00
2	226.33	2.60	96.02	1.36	0.02	3.54
3	235.44	3.88	91.71	4.37	0.04	5.14
4	237.23	5.05	90.36	4.51	0.08	5.24
5	238.49	5.05	89.94	4.93	0.08	7.14
6	240.62	5.05	89.17	5.58	0.20	2.36
7	241.39	5.51	88.64	5.65	0.20	7.25
8	241.61	5.66	88.48	5.64	0.22	6.98
9	241.87	5.82	88.33	5.63	0.22	5.64
10	242.17	5.83	88.15	5.65	0.37	6.35
Variance Decomposition of D(FDI)						
Period	**S.E.**	**D(EXPORT)**	**D(EXR)**	**D(FDI)**	**D(GDP)**	**D(ESCP)**
1	0.36	0.01	0.02	99.97	0.00	0.00
2	0.47	9.37	3.20	86.51	0.91	2.32
3	0.54	27.34	4.11	67.76	0.77	4.25
4	0.55	29.39	5.22	64.25	1.12	5.14
5	0.56	30.90	5.40	62.53	1.15	6.35
6	0.57	30.17	5.85	61.23	2.73	5.21
7	0.58	31.31	6.46	59.50	2.70	8.14
8	0.59	30.85	6.47	58.91	3.75	6.45
9	0.60	32.84	6.50	57.03	3.61	9.35
10	0.61	32.32	6.47	55.55	5.64	2.14
Variance Decomposition of D(GDP)						
Period	**S.E.**	**D(EXPORT)**	**D(EXR)**	**D(FDI)**	**D(GDP)**	**D(ESCP)**
1	54180	2.74	3.83	0.22	93.19	2.14
2	86578	9.91	6.38	3.82	79.87	2.36
3	88862	11.99	8.34	3.65	76.00	9.35
4	107289	34.69	5.74	7.32	52.24	6.35
5	137797	45.34	3.88	5.12	45.64	3.25
6	151942	37.31	5.82	4.32	52.53	2.35
7	153598	36.91	6.03	5.63	51.40	6.32
8	172857	43.53	5.39	10.13	40.94	4.21
9	200099	49.98	4.03	8.34	37.63	3.25
10	212192	44.46	5.24	7.53	42.74	3.21
Variance Decomposition of D(ESCP)						
Period	**S.E.**	**D(EXPORT)**	**D(EXR)**	**D(FDI)**	**D(GDP)**	**D(ESCP)**
1	80.29	3.21	15.24	5.14	22.35	79.32
2	78.48	9.35	14.31	6.24	45.18	85.14
3	62.30	5.98	13.25	3.21	39.25	95.16
4	89.21	4.16	19.42	9.15	46.32	99.25
5	97.39	8.65	22.34	7.65	39.15	96.35
6	42.15	4.85	23.15	9.36	61.35	88.34
7	98.71	9.14	26.17	8.12	59.35	89.17
8	17.59	4.87	24.19	9.14	61.48	92.35
9	29.58	5.12	24.98	6.28	60.35	94.16
10	21.29	7.39	19.45	7.16	57.16	97.88
Cholesky Ordering: D(EXPORT) D(EXR) D(FDI) D(GDP) D(ESCP)						

The change of historical information of each variable can explain over 90% variations in the change of itself in about a quarter. After each quarter, these explanations decrease gradually. All these findings can also be seen from the impulse response function discussed above.

5. Discussion and conclusion

The study has found that the changes in GDP, the exchange rate of VND/USD, foreign direct investment, and export can sometimes explain the fluctuation process of each other. In addition, the study has analyzed the influences of efficient supply chain management practices on the rate of export performance. This motive of this paper is to show the validity of the dynamic relationship among gross domestic product, the exchange rate of VND/USD, foreign direct investment, and export. The paper with the use of quarterly time-series data addresses the influence of shifts and interrelationship between them. This paper demonstrated systematically that dynamic relationships using the VAR technique with one model to show the dynamic relationship. Due to VAR estimation with lag three, we can see that the investors can utilize these factors to analyze the process of return generating. The results drawn by this paper perform a slight relationship among studied variables. The historical price of each variable is found to be not the only driver of that variable but also the other three other variables. The results also show significant application for policymakers. Vietnamese policymakers should closely follow all these four macroeconomic variables. Each variable may be used as a suitable forecaster of future changing of all of them in the short run. The results of this paper have proved that the relationship between the practices of supply chain management and the country's export performance is considerable and positive. The performance of supply chain management is positively linked with the performance of exports. The improvement in supply chain management leads to an improvement in the rate of export performance. The efficient supply chain management practices facilitate the export-oriented industries at different levels from the procurement of material to the production, and to the delivery of products in international markets. Results indicate that if these practices are effectively implemented and executed, there occurs a remarkable increment in the competitive advantages for domestic products, thus leads to exports performance.

We can see that the fluctuations of each variable are explained almost by itself. Therefore, this study suggests us to try some rational models to study each variable through its historical information such as AR, MA, or ARIMA. This will be carried out in near future research by the author.

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