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THE EFFECTS OF FOREIGN AND DOMESTIC SHOCKS ON THE TEXTILE EXPORTS OF PAKISTAN

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Abstract

The aim of this paper is to examine the impact of foreign and domestic shocks on the textile exports of Pakistan. The foreign shocks including adverse supply, negative financial and positive income shocks. The domestic shocks consist of the domestic macroeconomic factors of economic output, price level, interest rate and exchange rate. In order to meet the said objective, this paper has selected the Structural Vector Autoregressive (SVAR) model with non-recursive and block-exogenous assumption using high-frequency data. The results from the impulse response functions and variance decomposition have shown that, both the foreign and domestic shocks are significant in explaining the variability in the export demand of Pakistan's textile sector.

Keywords: Textile export, SVAR, Shocks, Pakistan

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Introduction

The textile industry of Pakistan is one of the significant sectors of the manufacturing industry. It shares around 8% in Pakistan's GDP growth and 40% in total manufacturing employment in the economy, more importantly, the share of textile commodities in Pakistan's total export is more than 60%[1]. For the developing economy with the surging trade deficit, the textile exports are the major source of foreign exchange earnings for Pakistan. The textile export demand is faced with number of issues, internationally the

[1] Source: Pakistan economic survey

growing numbers of textile competitors are shrinking the market share of Pakistan and domestically the energy crises are worsening the business environment. Given these challenges, the export demand for Pakistan's textile sector is vulnerable to any negative economic shocks, either foreign or domestic shocks.

The developing economies are constantly under stress from the negative supply shocks, notably the economies that rely on foreign crude oil. It is evident from 2008's abrupt rise in international crude oil prices that it left the economy of Pakistan on the verge of collapse. Because the rising oil prices had immense pressure on draining the foreign reserves and it becomes difficult for Pakistan to meets its international financial obligations[2]. Hence, Pakistan sought a bailout from IMF. Apart from the adverse supply shocks, the developing economies are also constrained by the economic or financial decisions in world leading economies like the United States, any adverse financial shocks arising from such global economies can also affect the economic activities in small economies.

The recent economic uncertainty on the global level has prompted to undertake a study on the readiness of Pakistan's textile export demand. Hence, it is crucial to examine the vulnerability of textile export demand, particularly to global economic shocks. For the underline objective, this paper has selected the Structural Vector Autoregressive (SVAR) model to carry out the dynamic analyses. The selection of SVAR model with non-recursive identification and block-exogenous assumption is largely in line with the previous literature on small developing economies. There are three foreign shocks generated from the model, the adverse supply shock, adverse financial shocks and positive demand shocks. The adverse supply shocks are represented by the increased price level of crude oil. The adverse financial shocks are represented as the rise in interest rate world over and positive demand shocks represent the rise in income level. Besides the foreign shocks, this paper also analyses the response of textile export to domestic macroeconomic factors.

The rest of the paper is organized as follows. Section 2 provides the literature review. Section 3 of this paper discusses the SVAR modeling. The section 4 provides the discussion on the results from SVAR model. The last section concludes the study.

[2] IMF country report 2012

Literature Review

The recent studies on Pakistan's export demand have mainly focused on the exchange rate volatility effects. For instance, Mustafa and Nishat (2004) studied the exchange rate volatility effects on the export demand for Pakistan since 1991 to 2004. They found that exchange rate regional markets. Similarly, Saqib and Sana (2012) extended the same empirical results of exchange rate volatility and export demand for Pakistan using a longer time series evidences from 1981 to 2010. They found that negative effects of exchange rate volatility persist in the long run. Recently, Khan et al. (2014) used GARCH models on the set of Pakistan's trading partners. They analyzed the volatility effects using single currency dollar and also bilateral currencies. Their study recommended using bilateral exchange rates to reduce the volatility effects on the export demand for Pakistan. All of the above studies have used aggregate data. Whereas, Aftab et al. (2012) analyzed the exchange rate volatility effects on the sectoral exports of Pakistan. Their findings supported the evidence of negative effects of exchange rate volatility on the export demand for all sectors in Pakistan. They propose that stabilisation in the exchange rate will overcome the negative effects on the export activity.

There are very limited studies that have particularly focused on the textile sector of Pakistan. For instance, Afzal (2012) has thoroughly analyzed the effects of electricity crises and positive changes in interest rate over the textile industry of Pakistan. His study concluded that besides electricity the continuous increase of interest rate in Pakistan has negatively affected the textile industry. Hence, its export competitiveness is also been compromised. Chaudhry and Hyder (2012) have carried out a comprehensive study on the factors that affect the textile export demand of Pakistan. Using yearly data from 1973 to 2006 they employed structural vector autoregressive (SVAR) models. They analyzed the effects of aggregate consumption of Pakistan's major trading partners over the export demand of textile. They found that Pakistan's overall textile exports respond positively to the consumption shocks originating in main trading partners. Secondly, they also found that domestic output also positively increase the textile export for Pakistan. The limitation of this study includes, it only focuses till 2006. Whereas, since 2008 Pakistan trade

fluctuations have increased and major structural changes have occurred in the domestic economy of Pakistan. So, there is a need to revisit the effects of foreign and domestic shock on the textile export demand for Pakistan.

A number of studies world over have recently examined the effects of foreign and domestic shocks on the export demand. For instance, Castro and Fernández (2011) have explored those domestic shocks hold negative effects on the export competitiveness in Spain. Ozcelebi and Yildirim (2011) have found that a positive shock in the exchange rates of Turkey results in increased export demand for bilateral trades. Bothe of these studies used SVAR model for the underline purpose. Using similar SVAR models Shioji and Uchino (2012) have analyzed the effects of negative foreign shocks, including oil prices, exchange rate and total imports over the automobile exports of Japan. They concluded that these foreign shocks are relatively more important to bring larger variations in the export demand for Japanese automobiles. For Malaysian electronic and electrical export demand, Othman et al. (2015) also found that foreign shocks are relatively more important than domestic shocks in explaining the fluctuations in exports.

Methodology

In order to study the effects of foreign and domestic shocks on the textile exports of Pakistan, this study relies on Structural Vector Autoregressive (SVAR) models. As the non-recursive identifications in SVAR models estimate the meaningful dynamics of the variables (Sims, 1986; Bernanke, 1986; & Shapiro and Watson, 1988). The analysis from SVAR is done through the impulse response functions and variance decompositions.

The economy of Pakistan can be shown by the structural form of VAR model as;

$$AY_t = \Gamma_0 D_0 + (\Gamma_1 L + \Gamma_2 L^2 + \cdots + \Gamma_n L^n) Y_t + \varepsilon_t \quad (1)$$

Where, A is a coefficients matrix of the structural contemporaneous variables. Y_t is a (n x 1) vector of endogenous variables. $\Gamma_0 D_0$ is a vector of deterministic variables including constant and dummy variable. $\Gamma_1 L$ is a n'th order polynomial matrix in the lag operator.

The vector of structural shocks(ε_t) satisfies the conditions of $E(\varepsilon_t) = 0$ and $E(\varepsilon_t \ \varepsilon_t\ ') = \Sigma\varepsilon = I$

Equation (1) can be written in the reduce form as ,

$$Y_t = A^{-1}\Gamma_0 D_0 + A^{-1}(\Gamma_1 L + \Gamma_2 L^2 + \cdots + \Gamma_n L^n)Y_t + A^{-1}\varepsilon_t \quad (2)$$

Where the reduced form residual $A^{-1}\varepsilon_t$ is represented as $A^{-1}\varepsilon_t = e^t$ which satisfies the condition of $E(e^t) = 0$ and $E(e_t\ e_t\ ') = \Sigma_e$ is a symmetric matrix. The variance-covariance matrix of the estimated residuals Σ_e and the variance-covariance matrix of the structural shocks $\Sigma\varepsilon$ are related as,

$$\Sigma_e = E(e_t e_t') = E\left(A^{-1}\varepsilon_t \varepsilon_t' A^{-1\prime}\right) = A^{-1}\Sigma_\varepsilon (A^{-1})' \quad (3)$$

Hence,

$$\Sigma_\varepsilon = A\Sigma_e A' \quad (4)$$

For a symmetric matrixΣ_e, consists $(n^2+n)/2$ unknown elements, which requires imposing $(n^2-n)/2$ additional restrictions to just identify the system, in order to recover all structural shocks (ε_t) from the estimated residuals (e_t). The equation (5) shows the restrictions imposed on the matrix of contemporaneous parameters A. In order to exactly identify the system, 28 coefficients must be restricted as zero, however the equation (5) consists of 4 additional zero restrictions, which are enough to over identify the system. The non-recursive zero restrictions in (5) are employed by following the method of Amisano & Giannini (1996).

$$AY_t = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & 1 & 0 & 0 & 0 & 0 \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & \alpha_{64} & \alpha_{65} & 1 & 0 & 0 \\ \alpha_{71} & \alpha_{72} & 0 & \alpha_{74} & \alpha_{75} & 0 & 1 & \alpha_{78} \\ \alpha_{81} & \alpha_{82} & \alpha_{83} & \alpha_{84} & \alpha_{85} & \alpha_{86} & \alpha_{87} & 1 \end{bmatrix} \begin{bmatrix} \text{LOIL} \\ \text{LYUS} \\ \text{FFR} \\ \text{LYP} \\ \text{LCPIP} \\ \text{PRP} \\ \text{LTEXT} \\ \text{LREER} \end{bmatrix} \quad (5)$$

The data vector in (5) uses the monthly data spanning from the seventh month of 2003 to the sixth month of 2016. The source of data is IMF and the central bank of Pakistan. All the data is transformed into natural log except interest rate series. The system of equation (5) consists a total of eight variables and it is divided into two blocks. The foreign block includes first three variables and the ordering of the variable is guided by the Dungey & Fry (2003). The LOIL shows the international oil prices index and placed ahead of all variables by assuming it is the most exogenous variable in the system. The second variable in the column is LYUS representing the foreign output, the United States monthly industrial production index is used for this purpose. The third variable in (5) shows the foreign monetary policy FFR, it is also represented by the federal fund's rate. Following Cushman & Zha (1997) and Karim & Karim, (2014) the foreign block is kept ahead of the domestic block and it is kept as block exogenous. This implies that domestic block cannot interact with foreign block even in the lags (Allegret et al., 2012 and Nizamani et al., 2017).

The rest of the variables in (5) represent the domestic block. Although the point of interest is to study the effects only on the textile export demand but other macroeconomics variable are also important to be included in the system, as they determine the export demand for Pakistan. The domestic block leads with LYP showing the output level of Pakistan economy, the industrial production index is used to proxy the output level. The LCPIP is the consumer price index of Pakistan. Both LYP and LCPIP are influenced simultaneously with foreign variables as Pakistan is a small open economy. Whereas, the PRP is the short term interest rate of Pakistan and it only interacts with domestic output and price level. The seventh variable in (5) LTEXT is the textile export of Pakistan. The textile export simultaneously influenced by the foreign variables of oil and output level and also with

domestic output, price level and exchange rates. All of these variables can affect the export demand in short term. The last variable in the system is LREER which is the real effective exchange rate and it represents the exchange rate of Pakistan rupee with the basket of major currencies.

Results

In order to discuss the main findings from the impulse response functions, it is important to discuss the statistical properties of variables and some preliminary check on the SVAR model. Table 1 provides the unit root test results from the widely used Augmented Dickey Fuller test. The test reports that all variables are stationary at first difference except interest rate and domestic output series that are stationary in levels. Following Kim & Roubini (2000) and Ibrahim & Sufian (2014) this paper estimates SVAR in level despite mix order of variables as it provides long run information about the variables. The optimal lag length of four is selected by relying on Akaike Information Criterion (AIC).

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test

	With Trend		Without Trend	
Variables	**Statistics**	**P-values**	**Statistics**	**P-values**
LOIL	-2.606	0.856	-3.605*	0.093
Δ LOIL	-5.816***	0.001	-5.863***	0.001
LYUS	-1.380	0.958	-1.661	0.443
ΔLYUS	-4.311***	0.001	-4.330***	0.001
FFR	-3.971*	0.091	-2.643	0.681
Δ FFR	-8.310***	0.001	-8.981***	0.001
LYP	-3.232*	0.092	-2.827	0.675
ΔLYP	-12.370 ***	0.001	12.578***	0.001
LCPIP	-0.327	0.912	-1.766	0.457
Δ LCPIP	-4.254***	0.001	-4.238***	0.001
PRP	-3.627*	0.090	-3.907**	0.041
ΔPRP	-9.207***	0.001	-9.736***	0.001
LTEXT	-1.293	0.962	-2.503	0.694
Δ LTEXT	-4.891***	0.01	-4.912***	0.001
LREER	-0.924	0.891	-3.449*	0.095
ΔLREER	-4.273***	0.001	-4.230***	0.001

Before proceeding to the estimation results from the SVAR model it is pivotal to validate the over-identification placed in (5). The Likelihood Ratio (LR) test is used to validate the null hypothesis of additional restrictions is valid, the calculated probability value of LR test is 0.34 for four additional restrictions on (5), hence the extra identification placed on the system are valid. Table 2 provides the estimation results from the SVAR model. As the objective of the SVAR estimation is not the parameter estimation but the dynamic interaction of the variable, however, most of the parameter carries expected signs. The dynamic interaction of the variable is presented by the Impulse Response Functions.

Table 2: Estimations from SVAR Model

LOIL	LYUS	FFR	LYP	LCPIP	PRP	LTEXT	LREER
1	0	0	0	0	0	0	0
-0.0032 (0.0089)	1	0	0	0	0	0	0
-0.4427 (0.4405)	1.9759 (4.0458)	1	0	0	0	0	0
-0.0179 (0.0363)	-0.1613 (0.3324)	-0.0034 0.0067	1	0	0	0	0
-0.0151 (0.0057)	0.0501 (0.0518)	0.0049 (0.0011)	-0.0122 (0.0128)	1	0	0	0
0	0	0	-1.0326 (1.9131)	13.8204 11.2920	1	0	0
0.0334 (0.2442)	-1.6114 (1.6665)	0	-0.2001 (0.2666)	-1.2132 (2.2723)	0	1	2.5613 (3.8757)
0.0635 (0.0142)	-0.3420 (0.1148)	0.0016 (0.0023)	0.0642 (0.0345)	-0.4960 (0.1674)	-0.0023 (0.0012)	-0.0499 (0.0702)	1

Note: Numbers in parenthesis are the estimated standard errors

The Figure 1 presents the impulse response functions from the SVAR model. The left-hand side panel shows the response of textile exports of Pakistan to the shocks in the foreign variables, while the right-hand side panel shows the response from domestic variables. The response of the textile export from the positive shock of an oil prices shows that, export demand increases throughout the horizon of three years. However, the response is only significant till the end of first quarter. Although this response is unusual in a way that often increases in oil prices is taken as negative supply shock and it reduces the demand but in this case, it shows a positive response. The second response in the left panel is from the

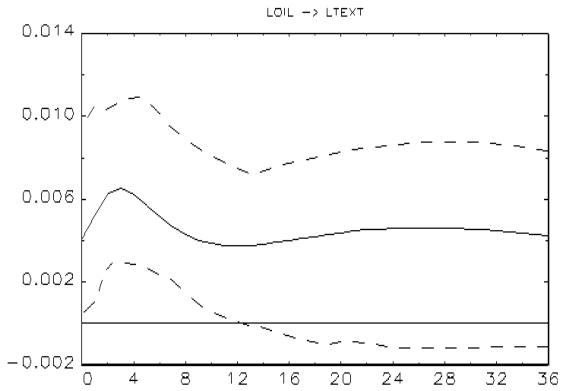
increased output globally, the response is positive and significant but it is the delayed response. This shows that when global output or income level increases the demand for Pakistan textiles also increases. The last response is from the increase in international interest rate level. The increase in foreign interest rate implies that slowdown of economic activity world over. The response of textile export demand for Pakistan is as expected, that it negative response throughout the whole period.

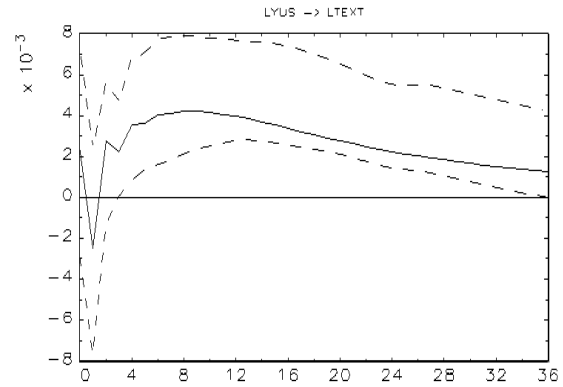
The right-hand side panel shows the response from the domestic variables. The first response of the textile export corresponding to increase in domestic output level. The response initially is negative but as the price elasticity adjusts to the new level in the medium run the response become significantly positive. The second response is from the increased price level in the domestic economy of Pakistan. The response is somewhat expected, once the prices increase the supply of textile products also increases. The middle response is from the increase in the short-term interest rate, the textile sector responds negatively initially in the short run but as the cost and prices adjust in the medium run the response becomes positive in medium to long run. The last response is from the appreciation of exchange rate. As the Pakistan rupee appreciates comparing to other currencies the textile export goes down significantly. This response is similar to the standard theoretical explanations, that when the exchange rate appreciates the export competitiveness of the domestic country goes down.

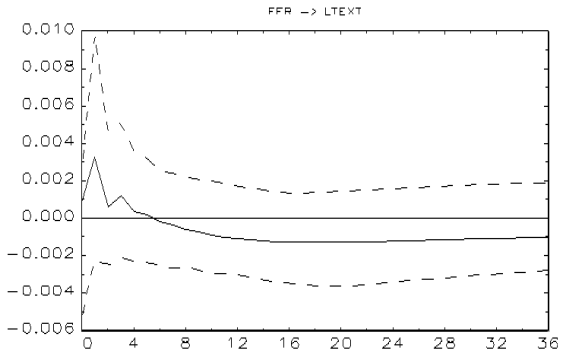
Besides the impulse response functions, the variance decomposition also provides the percentage variations in a variable by other variables in the system. The variance decomposition of LTEXT is reported in the Table 3. It is evident that apart from its own variations in LTEXT the exchange rate is the major contributor. The second largest contribution in the variations of textile export of Pakistan comes from the oil prices. Secondly, the combined contribution from all of the foreign variables is significantly larger in the variations of LTEXT. It means that beside domestic variables, the foreign variables are important in explaining the larger variations in textile export demand of Pakistan.

Figure 1: Impulse Response Functions from SVAR Model

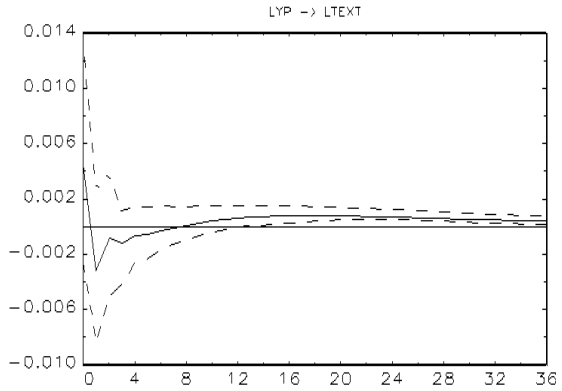
Response of LTEXT to Foreign Shocks

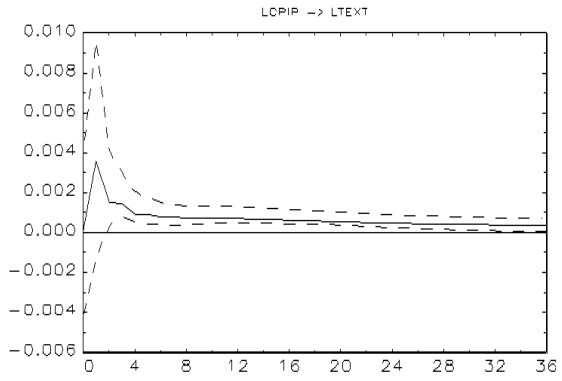


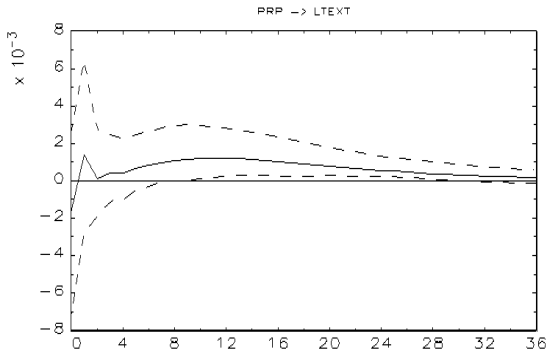




Response of LTEXT to Domestic Shocks







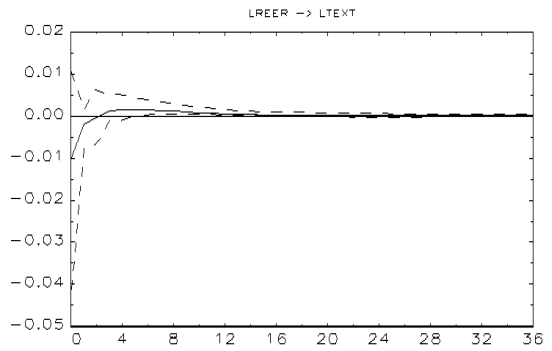


Table 3: Variance Decomposition of LTEXT

Horizon	LOIL	LYUS	FFR	LYP	LCPIP	PRP	LTEXT	LREER
1	0.02	0.01	0.00	0.02	0.00	0.00	0.86	0.10
2	0.04	0.01	0.01	0.03	0.01	0.00	0.80	0.10
3	0.07	0.02	0.01	0.03	0.01	0.00	0.78	0.09
4	0.10	0.02	0.01	0.03	0.01	0.00	0.75	0.08
5	0.12	0.03	0.01	0.02	0.01	0.00	0.72	0.08
6	0.14	0.04	0.01	0.02	0.01	0.00	0.69	0.08
7	0.15	0.05	0.01	0.02	0.01	0.00	0.67	0.08
8	0.16	0.06	0.01	0.02	0.01	0.00	0.65	0.08
9	0.17	0.07	0.01	0.02	0.01	0.01	0.64	0.08
10	0.18	0.08	0.01	0.02	0.01	0.01	0.62	0.08
11	0.18	0.08	0.01	0.02	0.01	0.01	0.61	0.08
12	0.19	0.09	0.01	0.02	0.01	0.01	0.60	0.07
13	0.19	0.10	0.01	0.02	0.01	0.01	0.58	0.07
14	0.20	0.11	0.01	0.02	0.01	0.01	0.57	0.07
15	0.20	0.11	0.01	0.02	0.01	0.01	0.56	0.07
16	0.20	0.12	0.01	0.02	0.01	0.01	0.55	0.07
17	0.21	0.12	0.01	0.02	0.01	0.01	0.54	0.07
18	0.22	0.13	0.01	0.02	0.01	0.01	0.53	0.07
19	0.22	0.13	0.01	0.02	0.01	0.01	0.53	0.07
20	0.23	0.13	0.02	0.02	0.01	0.01	0.52	0.06

Conclusion

This paper has provided the empirical evidence on the impact of foreign and domestic shocks on the textile export demand of Pakistan. For the underline purpose the SVAR model with non-recursive and block-exogenous assumption is selected. The analysis is based on the monthly data from 2003 to 2016. The results from the impulse response functions have shown that, with regard to foreign shocks, the export demand responds positively to the negative shocks in oil prices. Whereas, the response of textile export to positive foreign output shock is also a positive, implying that when international income goes up the export of textile will also follow up. The response of textile export to negative financial shocks shows that in the long run, it has negative effects on the exports. Moreover, the response of textile export to domestic macroeconomic factors has revealed that the response is positive to the increasing price and output level. Whereas, it has responded

negatively to rising interest rate and exchange rate. The variance decomposition has shown that apart from exchange rate the combined contribution from all of the foreign variables is significantly larger in the export demand for textiles.

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