Import Demand Response of MFA Apparel/Non-Apparel Fibers & Cottons in the U.S.: A Case of China & HK

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Abstract

This paper documents the export performance of MFA fibers mainly in cottons exported from Mainland China and Hong Kong to the U.S. during year 1989-2005. We use the Co-integration and error correction approach to investigate if long run relationships among variables existed. The empirical results suggest that there exists a unique lung-run relationship among import price and quantity, real income per capita, and trade liberalization. The short-run dynamic of export demand functions were estimated by error correction models, in which the error correction term was found to be correctly signed. Furthermore, the long-run price and income elasticity to import demand were also estimated by two stage least squares (2SLS). Finally, a long-run forecasting model derived from 2SLS was discussed. Our empirical results provide insights to private and government agencies that are actively engaged in the business.

I. Introduction

The aim of this paper is to investigate the behavior of export performance, in

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particular the role played by income, prices, and trade liberalization in the determination of MFA fibers and cottons (apparel and non-apparel) that was imported from HK and Mainland China to the U.S. Quarterly data from 1st quarter, 1989 to 2nd quarter, 2005 was collected from the U.S. Department of Commerce, Office of Textiles and Apparel[1]. First, we apply co-integration and error correction model to the data, examine the sign and extend that real income per capita, prices, and trade liberalization affecting import demand for MFA apparel and non-apparel fibers exported to the U.S. from Hong Kong and Mainland China during the year 1989-2005. We believe the above fundamental research perspectives are important to international textile and clothing buyers and sellers as well as the trade policy makers.

The paper is divided into four sections. Section 2 provides econometrics methodology for addressing the above issues. The main findings are presented in section 3. Section 4 concludes.

2. Econometrics methodology

2.1 Long Run Import Demand Function

The long run import demand function of MFA fibers and cottons exported to the U.S. from H.K and Mainland China specifies as:

$$LM_{i,t} = \alpha_{i,0} + \alpha_{i,1} LP_{i,t} + \alpha_{i,2} LGDP_t + \alpha_{i,3} D_{i,3} + \varepsilon_{i,t} \quad (1)$$

Where M is the import quantity while the lower case i identifies apparel/non-apparel fibers and cottons; P is unit price of MFA items imported from Mainland China & H.K.; GDP is the real GDP per capita of the U.S. (base year at 2000); D is an intercept dummy variable with values 0 for 1989-1998 and 1 for 1998-2005; u is random disturbance term with its usual classical assumptions; and L is natural logarithm transformation operator. We expect $\alpha_1<0$, $\alpha_2>0$, $\alpha_3>0$.

[1] Original Data may be downloaded from **http://otexa.ita.doc.gov/msrpoint.htm**

However, it was well known that spurious regression is problematic if using Ordinary Least Squares (OLS) when time series of LM_{it}, LP_{it}, and $LGDP_t$ are not with the same order of integration. Moreover, if time series have a unit root we need to take the first difference of variables in eq(1) in order to obtain a stationary series:

$$\Delta LM_{i,t} = \alpha_{i,0} + \alpha_{i,1}\Delta LP_{i,t} + \alpha_{i,2}\Delta LGDP_t + \alpha_{i,3}D_{i,3} + \varepsilon_{i,t} \tag{2}$$

Maddala (1992) argued that "long-run information" in the data was ignored in eq(2) once the data was manipulated by taking its first difference. Hence, the error correction (EC) term should be introduced and it's the central idea of co-integration theory. The one period lagged EC term, which integrates the short-run dynamics, in the long run demand function was introduced and eq (2) becomes:

$$\Delta LM_{i,t} = \beta_{i,0} + \sum_{j}^{1}\beta_{i,j,1}\Delta LM_{i,j,t-j} + \sum_{j}^{0}\beta_{i,j,2}\Delta LP_{i,j,t-j} + \sum_{j}^{0}\beta_{i,j,3}\Delta LGDP_{i,t-j} + \beta_{i,4}EC_{i,t-1} + \alpha_{i,3}D_{i,3} + \varepsilon_{i,t} \tag{3}$$

where $EC_{i,t-1}$ is the one period lagged error-correction term and eq(3) is called the Error Correction Model (ECM).

2.2 Unit Root Test

The order of integration of the variables in eq (2) may be determined by applying Augmented Dickey-Fuller (ADF). Consider a series at time t,

$$\Delta q_t = \alpha_0 + bq_{t-1} + \sum_{i=1}^{k}\sigma_i \Delta q_{t-i} + \varepsilon_t \tag{4}$$

Where $q_{,t}$ can be replaced by time series LM_{it}, LP_{it}, and $LGDP_{it}$, $\Delta q_{,t}$ is the series of interest in first difference. $\sum_{i=1}^{k}\sigma_i \Delta q_{t-i}$ is the augmenting term and ε_t is the Independently and Identically (IID) distributed error , i.e. $\varepsilon_t \sim id(0,\sigma^2)$. Equation (4) are estimated by Ordinary Least Square (OLS) technique, and the unit root null hypothesis is rejected when the ADF-statistic is found to be significant for the null: b =0 against the alterative b <0. Findings are presented in table 1.

Phillips and Perron (1988, PP thereafter) propose an alternative (nonparametric) method of controlling for serial correlation when testing for a unit root and the findings are presented in table 2.

2.3 Johansen and Jeuselius Cointegration test and ECM

The term "cointegration" can be viewed as the statistical expression of the nature of equilibrium relationships. Variables may draft apart in the short run but if they diverge without bound no equilibrium relationship could be said to be existed. Therefore, economic significance can be defined in terms of testing for equilibrium.

If all series are I(1) we may apply Johansen and Jeuselius(1990) cointegration test in order to see whether any combinations of the variables in eq(1) are cointegrated. Given a group of non-stationary series, we may be interested in determining whether the series are cointegrated, and if they are, in identifying the cointegrating (long-run equilibrium) relationships. We implement Vector Auto-Regressive (VAR)-based cointegration tests developed by Johansen (1991, 1995) to the long run import demand function in eq (1).

Consider a VAR of order p:

$$y_t = A_1 y_{t-1} + ... + A_P y_{t-p} + \beta x_t + dD + \varepsilon_t \qquad (5)$$

Where y_t is a k-vector of non-stationary I(1) variables and in our case it consists LM_{it}, LP_{it}, and $LGDP_{it}$, x_t is a -vector of deterministic variables, d is the exogenous dummy variable and ε is a vector of innovations

We can rewrite the VAR as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \beta x_t + \varepsilon_t \qquad (6)$$

where $\Pi = \sum_{i=1}^{p} A_i - \mathrm{I}$, $\Gamma_i = -\sum_{j=i+1}^{p} A_j$

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank r<k , then there exist kxr matrices α and β each with rank r such that Π=αβ' and $\beta' y_t$ is I(0). r is the number of cointegrating relations (the cointegrating rank) and each column of β is the cointegrating vector. As explained below, the elements of α are known as the adjustment parameters in the VEC model. Johansen's method is to estimate the Π matrix from an unrestricted VAR and to test whether we

can reject the restrictions implied by the reduced rank of Π. Empirical findings are presented in table 3. In case a unique cointegrating relationship was found we will estimate eq (3) in order to see the short-run dynamic behavior of the import demand function. Empirical findings of ECM are presented in table 4.

3. Empirical results

3.1 unit root test

Table 1 & 2 presents the result for ADF and PP unit root test respectively on variable LM_{it}, LP_{it}, and $LGDP_{it}$. The number of augmenting terms, k was chosen by Modified Akaike Information Criterion (MAIC) as suggested by Elliot, Rothenberg and Stock (1996). Two tests consistently show evidence that all series are I (1) variables. ADF and PP unit root tests with time trend draw to the same conclusion, but it will not be reported here to save space.

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Insert Table 1, 2 About Here

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3.2 Johansen and Jeuselius Cointegration test and ECM

Lag of three in level for the Vector Auto-Regressive (VAR) model specification was selected as suggested by Pesaran and Pesaran (1997). Table 3 presents the findings. Take Hong Kong's apparel/non-apparel fibers as an example, we first look at null hypothesis of no cointegration (r=0) existed. The p-value of the maximal eigenvalue test for apparel and non-apparel fibers are 0.059 & 0.085 respectively, therefore we conclude that the null hypothesis of no cointegration (r=0) was rejected and the conclusions are in favor of the alternative of r=1 at the 10% significant level.

Since the null hypothesis of $r \leq 1$ & $r \leq 2$ cannot be rejected for both apparel and non-apparel fibers at the 10% significant level we hence conclude that there is a unique cointegrating relationship among variables LM_{it}, LP_{it}, and $LGDP_{it}$ for both apparel and non-apparel fibers in Hong Kong case. Trace test also found the same conclusion that there was strong evidence in support of a unique cointegrating relationship among variables LM_{it}, LP_{it}, and $LGDP_{it}$ for both apparel and non-apparel fibers at the 5% significant level. For other cases under investigation, we also found a unique cointegrating relationship among variables.

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3.3 Estimation of an error-correction model

After confirming that a unique cointegrating relationship existed, we can go further to examine the short run dynamic behavior of the import demand function in eq (3). Three lags of the explanatory variables was selected and of the one period lagged error correction term in the right hand side in eq (3). Table 4 presents the findings. The EC coefficient for apparel/non-apparel fibers in Hong Kong case is estimated at -0.36 and -0.3 respectively, which are statistically significant at 1% level and has the correct sign.

In Mainland China the EC coefficient for apparel/non-apparel fibers is estimated at -0.86 and -0.6 respectively, which are also statistically significant at 1% level and has the correct sign. It suggests that there is higher speed of adjustment towards the equilibrium in Mainland China as compared to Hong Kong's case. Appendix 1a-1h presents impulse response function of different pair-wise variables combination in our estimated VECM model.

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3.4 Long Run Price and Income elasticity

Table 5 presents estimates (normalized cointegrating coefficients) for Johansen cointegration relation such that:

$$LM + C1 * LP + C2 * LGDP = I(0) \quad (7)$$

Rewrite Eq.(7) we have:

$$LM = -C1 * LP - C2 * LGDP \quad (8)$$

The restricted price and income elasticity can be represented by coefficients C1 and C2 respectively. Taking Hong Kong's apparel/non-apparel fibers as an example, our estimates suggest the following long run relationship:

Apparel Fibers: $LM_{t-1} = -4.3 * LP_{t-1} + 1.4 * LGDP_{t-1}$ (9)

Non-apparel Fibers: $LM_{t-1} = -0.62 * LP_{t-1} + 0.68 * LGDP_{t-1}$ (10)

Further to Johansen's model, we follow B. Algieri(2004) and apply two stage least squares (2SLS) approach due to endogenous problem which may be raised by Johansen approach. The long run cointegration relationship among variables is given by the Bewley's Transformation formalized as follows, taking apparel/non-apparel fibers in Hong Kong's case as an example:

Apparel Fibers: $LM_{t-1} = -0.93 * LP_{t-1} + 5.72 * LGDP_{t-1}$ (11)

Non-apparel Fibers: $LM_{t-1} = -1.13 * LP_{t-1} + 4.85 * LGDP_{t-1}$ (12)

Empirical findings for apparel and non-apparel items are presented in table 5a-g. Taking Hong Kong's apparel/non-apparel fibers as examples, the long run price and income elasticity are –0.93 & 5.72 respectively for apparel fibers, and it implies a reduction in import price of 10% brings a rise in imports of 9% while an increase in GDP pr capita of 10% brings a rise in imports of 57%. For non-apparel fibers, the long run price and income elasticity are –1.13 & 4.85, which implies a reduction in import price of 10% brings a rise in imports of 11% and an increase in GDP pr capita of 10% brings a rise in imports of 49%.

Relatively lower price elasticity of import demands as compared to that of income elasticity under MFA is not surprising because of quota-constraint; moreover, higher income elasticity may reflect the fact that items are attractive in the current price level.

Surprisingly, the estimated dummy for apparel and non-apparel are with negatively sign even the magnitude is small. It may be the case that MFA was abolished eventually but was at the same time replaced by some other tariff and non-tariff barriers like anti-dumping policies. After MFA abolishment, Mainland China and Hong Kong are facing higher price-competition from other exporting countries. Finally, import demand forecast of the above 2SLS models together with its forecasting performance are presented in appendix 2a-2h and were found to be satisfactory.

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Insert Table 5.a-g About Here

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4. Conclusion

In our empirical examination of the MFA apparel/non-apparel fibers and cottons exported to the U.S. from Mainland China and Hong Kong during years 1989-2005, we applied cointegration, error correction and two stages least squares approaches to the US's import demand function.

First, we find a unique equilibrium relationship among import quantity demanded, imported price, U.S. GDP per capita with the dum98 dummy variable denotes the MFA liberalization date.

Second, in order to determine the short run dynamics around the equilibrium relationship, we estimated an Error Correction Model. Import prices, GDP per capita, and a dummy, which captured the trade liberalization program are found to be significant determinants of the short run dynamics of the import demand function. The error correction term is also found to be statistically significant and with correct sign indicating a high-speed adjustment to equilibrium where higher speed adjustment in Mainland China was found as compared to that of Hong Kong.

Third, the long run price and income elasticity was found to be significant with expected signs. The low price elasticity to import demand may due to tariffs and non-tariffs trade obstacles imposed by the U.S. government. Moreover, high-income elasticity to import demand implies that textiles items are attractive at current price level. The combination of low price elasticity and high-income elasticity to imports implies that there are rooms for marginal profit to increase.

Finally, the estimated dummy for apparel/non-apparel is with negatively sign even the magnitude is small. It may due to substitution effect between MFA abolishment and tariff and non-tariff barriers, where the latter dominates the former effect on import performance.

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Table 1. ADF Statistics

Hong Kong Time Series	ADF test stat.	p-value	Conclusion	k
A*				
LM_{it}	-1.18	0.678	I(1)	8
LP_{it}	-0.83	0.803	I(1)	7
B*				
LM_{it}	-1.936	0.314	I(1)	3
LP_{it}	-0.214	0.931	I(1)	4
C*				
LM_{it}	-0.585	0.866	I(1)	8
LP_{it}	0.312	0.977	I(1)	11
D*				
LM_{it}	-1.793	0.381	I(1)	3
LP_{it}	-1.21	0.667	I(1)	3
Mainland China Time Series	**ADF test stat.**	**p-value**	**Conclusion**	**k**
A*				
LM_{it}	2.165	0.99	I(1)	4
LP_{it}	-0.821	0.806	I(1)	4
B*				
LM_{it}	0.186	0.97	I(1)	4
LP_{it}	-1.108	0.708	I(1)	0
C*				

LM_{it}	-1.699	0.999	I(1)	4
LP_{it}	-1.07	0.722	I(1)	4
D*				
LM_{it}	-0.286	0.92	I(1)	4
LP_{it}	-1.84	0.358	I(1)	4
$LGDP_t$	0.404	0.984	I(1)	5

*Note: A, B, C and D represents apparel fibers, non-apparel fibers, apparel cottons, and non-apparel fibers respectively.

Table 2. P-P test Statistics

Hong Kong Time Series	**PP test stat.**	**p-value**	**Conclusion**	**K**
A*				
LM_{it}	-0.478	0.982	I(1)	4
LP_{it}	-2.275	0.183	I(1)	7
B*				
LM_{it}	-2.549	0.109	I(1)	3
LP_{it}	-1.662	0.445	I(1)	4
C*				
LM_{it}	-1.285	0.632	I(1)	8
LP_{it}	1.033	0.997	I(1)	7
D*				
LM_{it}	-2.549	0.109	I(1)	5
LP_{it}	-1.776	0.389	I(1)	3
$LGDP_t$	0.471	0.985	I(1)	5

Table 3. Johansen-Juselius maximum likelihood cointegration tests

Hong Kong							
Maximal eigenvalue test				**Trace test**			
Apparel Fibers							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	29.153	0.059	r=0	r 1	23.16	0.026
r 1	r=2	5.991	0.697	r 1	r 2	5.975	0.616
r 2	r=3	0.016	0.899	r 2	r 3	0.016	0.899
Non-apparel fibers#							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	16.216	0.0851	r=0	r 1	25.2524	0.0376
r 1	r=2	8.53503	0.1431	r 1	r 2	9.03648	0.1669
r 2	r=3	0.50145	0.5418	r 2	r 3	0.50145	0.5418
Apparel cottons							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	27.706	0.0051	r=0	r 1	31.073	0.036
r 1	r=2	3.294	0.925	r 1	r 2	3.367	0.948
r 2	r=3	0.001		r 2	r 3	0.073	0.787
Non-apparel cottons#							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	16.1475	0.087	r=0	r 1	25.6896	0.033
r 1	r=2	9.12247	0.1145	r 1	r 2	9.54217	0.1398
r 2	r=3	0.4197	0.5805	r 2	r 3	0.4197	0.5805
Mainland China							
Maximal eigenvalue test				**Trace test**			
Apparel Fibers							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	29.5756	0.0026	r=0	r 1	41.0946	0.0017
r 1	r=2	10.5777	0.1767	r 1	r 2	11.5189	0.1815
r 2	r=3	0.94127	0.332	r 2	r 3	0.94127	0.332
Non-apparel fibers#							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	15.2169	0.1173	r=0	r 1	24.5044	0.0468
r 1	r=2	9.23636	0.1096	r 1	r 2	9.28743	0.153
r 2	r=3	0.05106	0.8531	r 2	r 3	0.05106	0.8531
Apparel							

cottons							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	34.1994	0.0004	r=0	r 1	42.0307	0.0012
r 1	r=2	7.78591	0.4009	r 1	r 2	7.83132	0.4836
r 2	r=3	0.0454	0.8312	r 2	r 3	0.0454	0.8312
Non-apparel cottons[#]							
Null	Alternative	Statistic	p-value	Null	Alternative	Statistic	p-value
r=0	r=1	18.619	0.0375	r=0	r 1	28.145	0.0155
r 1	r=2	8.24883	0.1592	r 1	r 2	9.52604	0.1406
r 2	r=3	1.27721	0.3018	r 2	r 3	1.27721	0.3018

Notes- i) The test was performed using Eviews 5.0.
ii) r stands for the number of cointegrating vectors.
iii) Exogenous dummy variable d was included.
iv)# assumes the level data have no deterministic trends and the cointegrating equations do not have intercepts

Table 4. Estimated error-correction model

Dependent variable ΔLM ***Hong Kong***	*Apparel Fibers*	Non-apparel Fibers	Apparel Cottons	Non-apparel Cottons
Independent Variables				
EC(-1)	-0.357	-0.304	-0.146	-0.259
	[-2.928]	[-2.478]	[-1.345]	[-2.327]
ΔLM(-1)	-0.046	0.111	-0.284	0.118
	[-0.421]	[0.868]	[-2.283]	[0.909]
ΔLM(-2)	-0.495	-0.143	-0.193	-0.238
	[-4.297]	[-1.214]	[-1.484]	[-2.013]
ΔLP(-1)	0.0308	0.157	0.270	-0.194
	[0.062]	[0.662]	[0.751]	[-0.753]
ΔLP(-2)	0.712	-0.419	-0.365	0.014
	[1.609]	[-1.773]	[-0.985]	[0.056]
ΔGDP(-1)	11.753	-4.487	5.123	-6.686
	[4.438]	[-1.540]	[2.613]	[-2.052]
ΔGDP(-2)	-7.24	9.120	-5.383	10.42
	[-2.210]	[2.911]	[-2.711]	[3.055]
Intercept	0.014	-0.01	0.014	-0.039
	[0.502]	[-0.428]	[0.739]	[-1.090]
D	-0.114	-0.005	-0.052	0.022
	[-2.747]	[-0.128]	[-1.964]	[0.439]

Adjusted R^2	0.615	0.345	0.494	0.432

Dependent variable ΔLM ***Mainland China***	*Apparel Fibers*	Non-apparel Fibers	Apparel Cottons	Non-apparel Cottons
Independent Variables				
EC(-1)	-0.863	-0.601	-0.999	-0.428
	[-4.361]	[-2.594]	[-4.854]	[-2.398]
ΔLM(-1)	-0.075	0.135	0.151	-0.095
	[-0.431]	[0.630]	[0.780]	[-0.519]
ΔLM(-2)	0.044	-0.115	0.218	0.100
	[0.341]	[-0.559]	[1.281]	[0.588]
ΔLP(-1)	0.418	0.220	0.715	1.226
	[0.922]	[0.415]	[1.923]	[2.772]
ΔLP(-2)	-0.439	0.380	0.126	1.198
	[-1.012]	[1.070]	[0.356]	[3.983]
ΔGDP(-1)	7.505	-1.027	-0.954	-1.866
	[1.633]	[-0.228]	[-0.149]	[-0.386]
ΔGDP(-2)	-13.86	-2.778	-5.064	-2.006
	[-3.496]	[-0.646]	[-0.867]	[-0.406]
Intercept	0.201	0.029	0.166	-0.029
	[4.249]	[0.583]	[2.698]	[-0.587]
D	-0.318	0.078	-0.257	0.141
	(0.098)	[1.134]	[-2.477]	[2.206]
Adjusted R^2	0.718	0.152	0.491	0.318

*t-statistics in []

Table 5. Normalized Conintegrating coefficients

Normalized cointegrating coefficients					
Hong Kong	C1	C2	Mainland China	C1	C2
Apparel fibers	-4.3	1.4	Apparel fibers	-1.62	5.83
Standard error	(0.85)	(0.74)	Standard error	(0.14)	(0.68)
Non-apparel fibers	-0.62	0.68	Non-apparel fibers	-1.49	5.24
Standard error	(0.25)	(1.07)	Standard error	(0.19)	(0.03)
Apparel cottons	-3.86	1.37	Apparel cottons	-1.62	5.83
Standard error	(0.6)	(0.56)	Standard error	(0.14)	(0.69)
Non-apparel cottons	0.32	-2	Non-apparel cottons	- 2.11	5.1
Standard error	(0.35)	(1.33)	Standard error	(0.23)	(0.023)

*standard error in parentheses

Table 6a.-Bewley Transformation-Apparel Fibers (Hong Kong)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-0.931	0.548	-1.698	0.095
LGDP(-1)	5.720	0.252	22.704	0.000
DUMMY	-0.815	0.080	-10.196	0.000
D.LM(-1)	0.960	0.323	2.975	0.004
D.LM(-2)	0.534	0.164	3.267	0.002
D.LM(-3)	0.338	0.177	1.906	0.062
SEASON	-0.072	0.147	-0.489	0.627

Table 6b.-Non-apparel Fibers (Hong Kong)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.127	0.238	-4.732	0.000
LGDP(-1)	4.845	0.028	173.226	0.000
DUMMY	-0.623	0.089	-6.981	0.000
D.LM(-1)	0.747	0.282	2.654	0.011
D.LM(-2)	0.751	0.247	3.043	0.004
D.LM(-3)	0.609	0.246	2.474	0.017
SEASON	-0.165	0.127	-1.292	0.202
D.P(-1)	1.864	0.571	3.263	0.002
D.P(-2)	1.862	0.537	3.469	0.001
D.P(-3)	1.277	0.563	2.269	0.028

Table 6c.-Apparel Cottons (Hong Kong)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY SEASON				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.311	0.416	-3.151	0.003
LGDP(-1)	5.267	0.041	127.003	0.000
DUMMY	-0.844	0.081	-10.380	0.000
SEASON	0.149	0.093	1.603	0.114

Table 6d-Non apparel Cottons (Hong Kong)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3) D.LGDP(-1 TO -2)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-0.894	0.328	-2.726	0.009
LGDP(-1)	4.809	0.039	123.308	0.000
DUMMY	-0.786	0.109	-7.198	0.000
D.LM(-1)	0.927	0.307	3.014	0.004
D.LM(-2)	0.828	0.264	3.135	0.003
D.LM(-3)	0.802	0.271	2.966	0.005
D.LP(-1)	1.417	0.766	1.850	0.070
D.LP(-2)	1.385	0.682	2.031	0.048
D.LP(-3)	1.769	0.711	2.489	0.016
D.LGDP(-1)	-23.165	7.509	-3.085	0.003
D.LGDP(-2)	-14.159	7.729	-1.832	0.073
SEASON	-0.031	0.164	-0.186	0.853

Table 6.e-Apparel Fibers (Mainland China)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3) D.LGDP(-1 TO -2)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.365	0.103	-13.205	0.000
LGDP(-1)	5.802	0.040	145.143	0.000
DUMMY	-0.234	0.033	-7.104	0.000
D.LM(-1)	0.717	0.089	8.070	0.000
D.LM(-2)	0.436	0.088	4.976	0.000
D.LM(-3)	0.374	0.066	5.699	0.000
SEASON	-0.036	0.060	-0.606	0.547
D.LP(-1)	1.015	0.233	4.350	0.000
D.LP(-2)	0.398	0.244	1.633	0.109
D.LGDP(-1)	6.213	2.680	2.318	0.024

Table 6.f-Non-apparel Fibers (Mainland China)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3) D.LGDP(-1 TO -2)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.492	0.078	-19.042	0.000
LGDP(-1)	5.323	0.011	497.873	0.000
DUMMY	0.325	0.055	5.890	0.000
D.LM(-1)	0.832	0.108	7.710	0.000
D.LM(-2)	0.571	0.152	3.760	0.000
D.LM(-3)	0.326	0.142	2.296	0.026
SEASON	0.023	0.061	0.383	0.704
D.LP(-1)	1.335	0.356	3.745	0.000
D.LP(-2)	0.866	0.355	2.441	0.018

Table 6.g-Apparel Cottons (Mainland China)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3) D.LGDP(-1 TO -2)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.376	0.087	-15.856	0.000
LGDP(-1)	5.522	0.033	167.571	0.000
DUMMY	-0.314	0.037	-8.482	0.000
D.LM(-1)	0.796	0.063	12.548	0.000
D.LM(-2)	0.579	0.078	7.444	0.000
D.LM(-3)	0.357	0.074	4.824	0.000
SEASON	-0.068	0.055	-1.238	0.221
D.LP(-1)	0.974	0.167	5.824	0.000
D.LP(-2)	0.581	0.161	3.620	0.001
D.LP(-3)	0.389	0.149	2.607	0.012

Table 6.g-Non-apparel Cottons (Mainland China)

Dependent Variable: LM(-1)				
Method: Two-Stage Least Squares				
Sample (adjusted): 1990Q1 2005Q2				
Included observations: 62 after adjustments				
Instrument list: LP(-1) LGDP(-1) DUMMY D.LM(-1 TO -3) SEASON D.LP(-1 TO -3) D.LGDP(-1 TO -2)				
Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
LP(-1)	-1.732	0.116	-14.923	0.000
LGDP(-1)	5.126	0.011	457.126	0.000
DUMMY	0.047	0.053	0.889	0.378
D.LM(-1)	0.792	0.084	9.414	0.000
D.LM(-2)	0.421	0.120	3.498	0.001
D.LM(-3)	0.200	0.105	1.911	0.062
SEASON	0.034	0.054	0.635	0.528
D.LP(-1)	1.055	0.253	4.176	0.000
D.LP(-2)	0.581	0.254	2.286	0.026

Appendix 1.-Impulse Response Function

Figure 1.-Impulse Response Function

Figure 1.a-Apparel Fibers (Hong Kong)

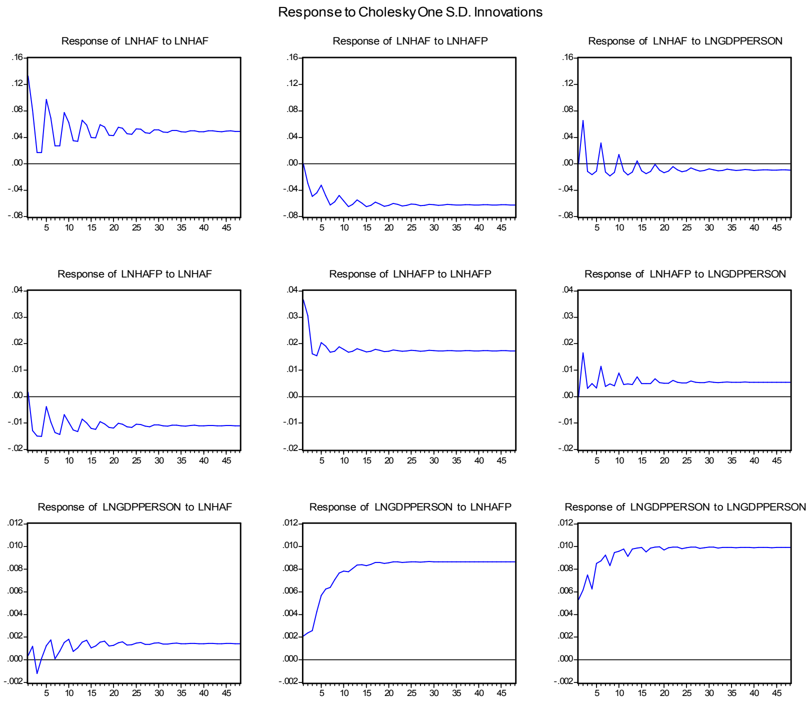


Figure 1.b-Non-apparel Fibers (Hong Kong)

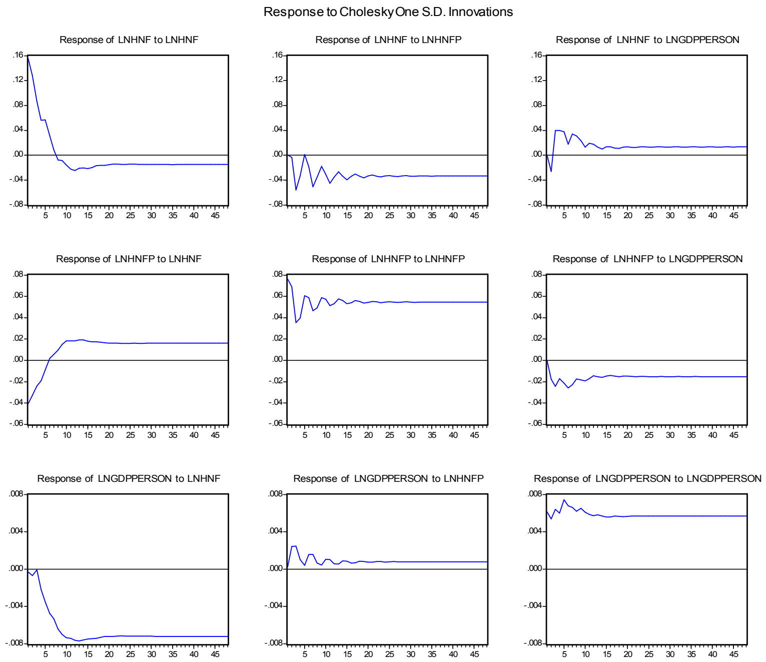


Figure 1.c-Apparel Cottons (Hong Kong)

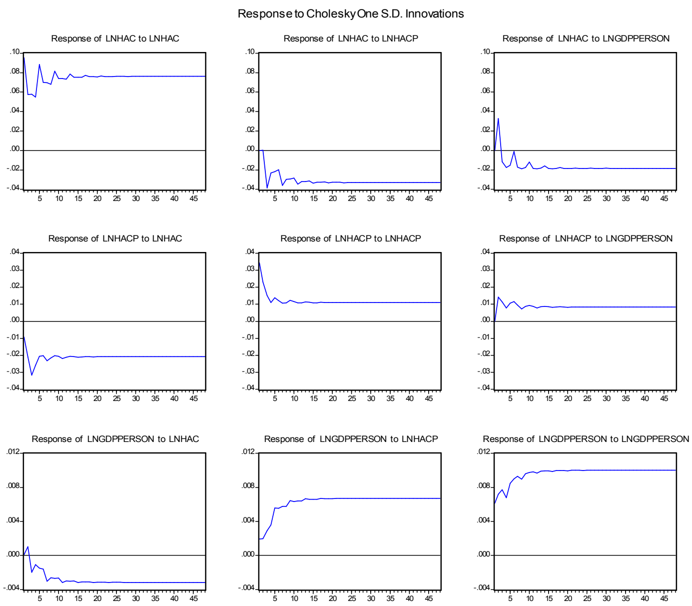


Figure 1.d-Non-apparel Cottons (Hong Kong)

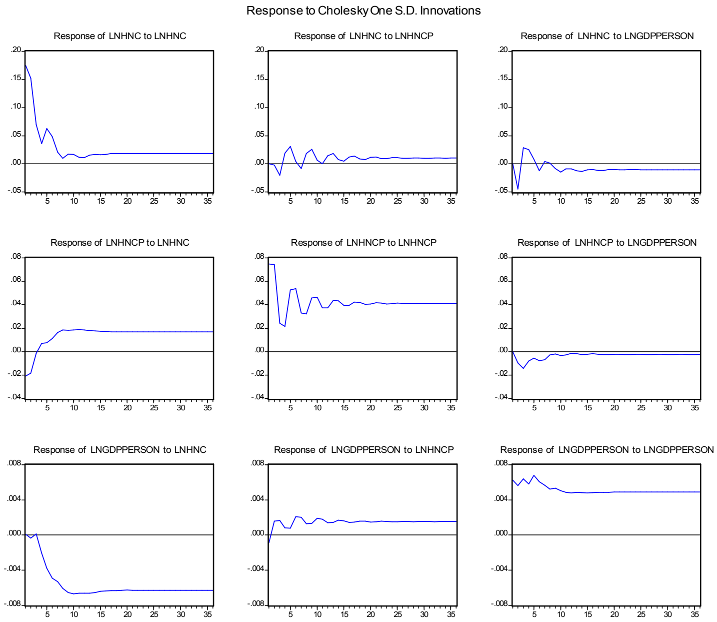


Figure 1.e-Apparel Fibers (Mainland China)

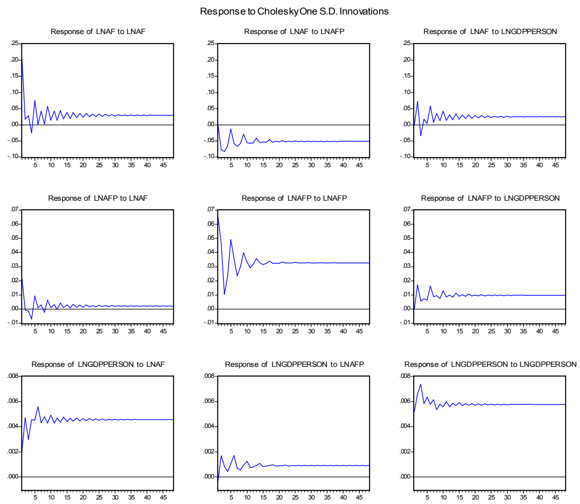


Figure 1.f-Non-apparel Fibers (Mainland China)

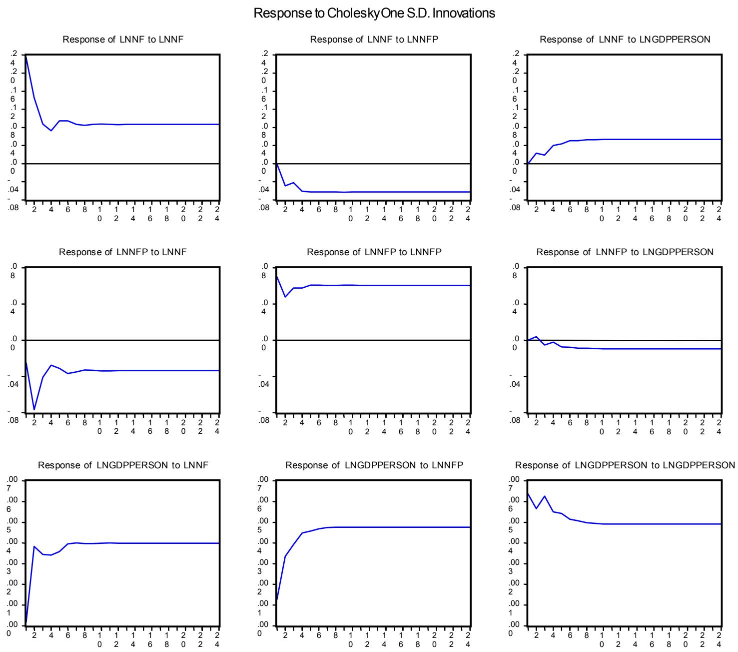


Figure 1.g-Apparel Cottons (Mainland China)

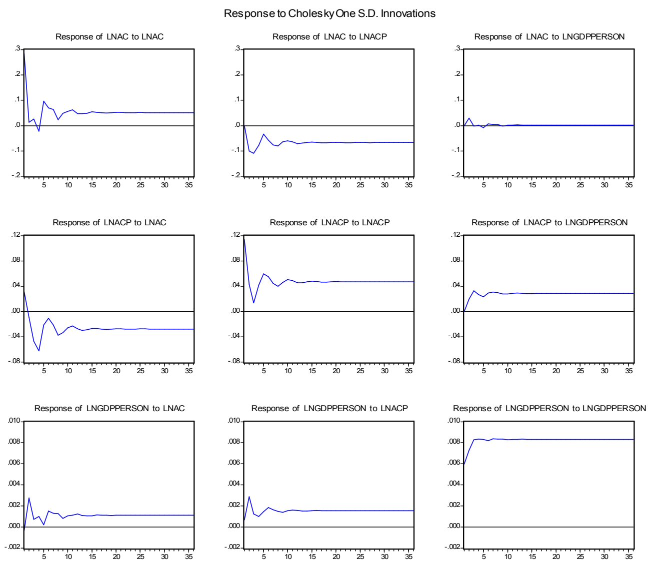
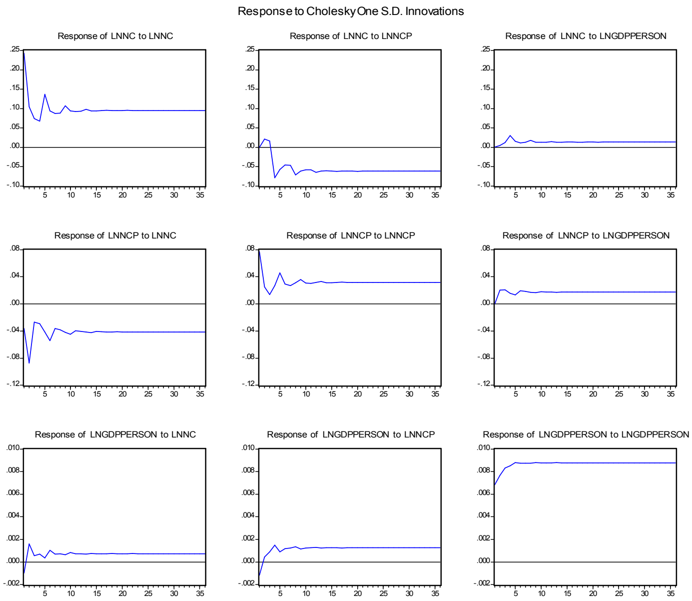
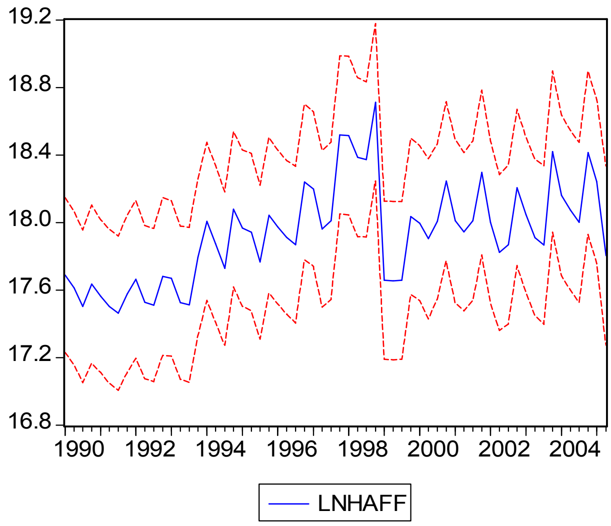


Figure 1.h-Non-apparel Cottons (Mainland China)



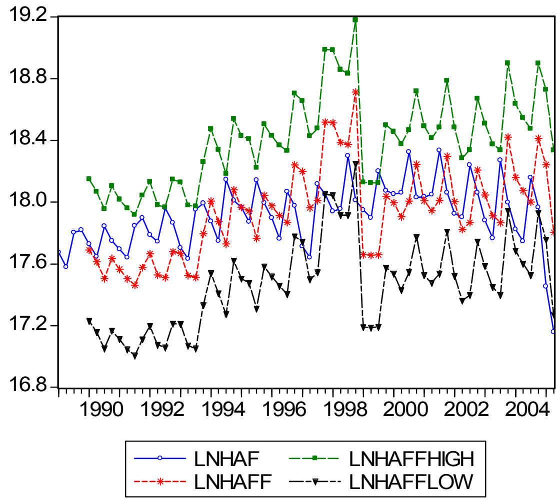
Appendix 2-Forecasts of long run models (2SLS)

Figure 2.a-Apparel fibers (HK)



Forecast: LNHAFF
Actual: LNHAF
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

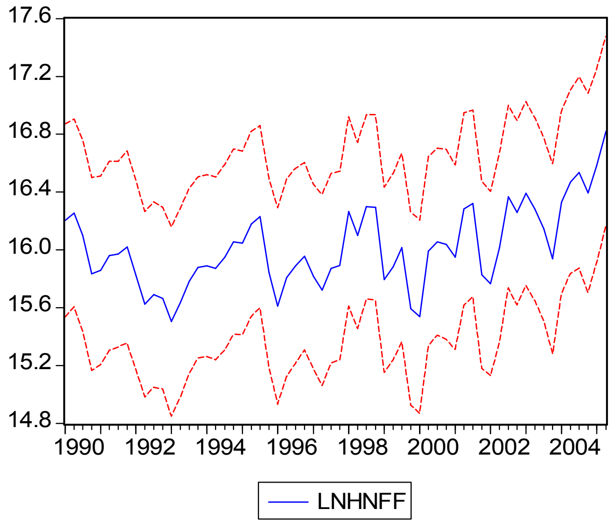
Root Mean Squared Error	0.308049
Mean Absolute Error	0.248603
Mean Abs. Percent Error	1.388179
Theil Inequality Coefficient	0.008590
Bias Proportion	0.000685
Variance Proportion	0.070816
Covariance Proportion	0.928499



Notes:

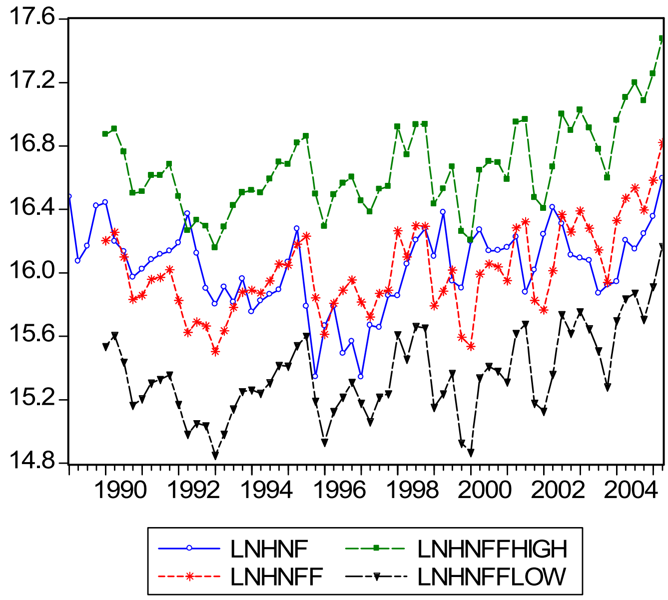
*-LNHAF=Apparel fibers raw data
-LNHAFF=Forecasted LHAF
-LNHAFFHIGH=Upper bound (2+S.E) of LNHAFF
- LNHAFFHIGH=Lower bound (2-S.E) of LNHAFF

Figure 2.b-Non-apparel fibers (HK)



Forecast: LNHNFF
Actual: LNHNF
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

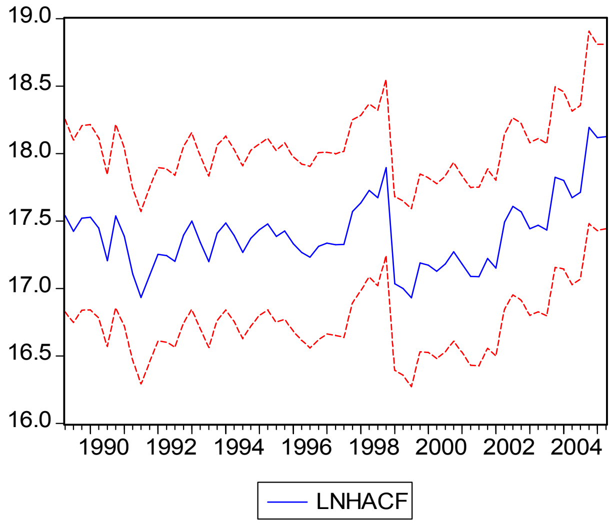
Root Mean Squared Error	0.281218
Mean Absolute Error	0.224199
Mean Abs. Percent Error	1.400278
Theil Inequality Coefficient	0.008776
Bias Proportion	0.000384
Variance Proportion	0.004572
Covariance Proportion	0.995043



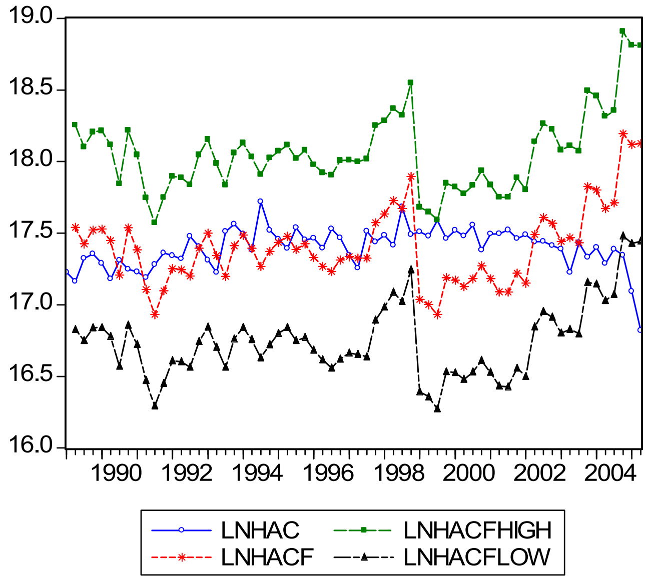
Notes:

*-LNHNF=Non-apparel fibers raw data
-LNHNFF=Forecasted LNHNF
-LNHNFFHIGH=Upper bound (2+S.E) of LNHNFF
- LNHNFFHIGH=Lower bound (2-S.E) of LNHNFF

Figure 2.C-Apparel cottons (HK)



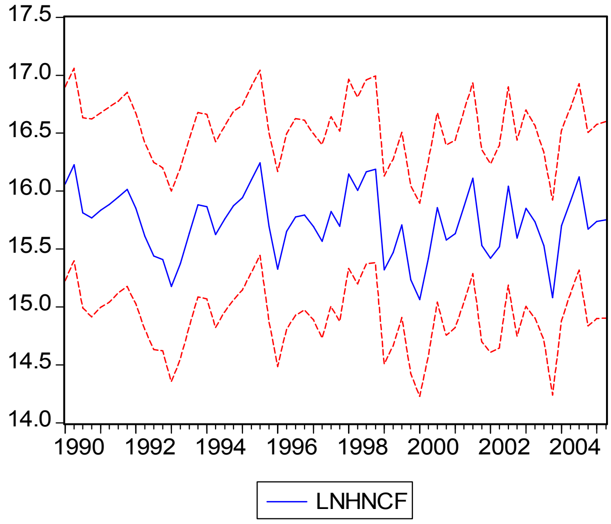
Forecast: LNHACF	
Actual: LNHAC	
Forecast sample: 1989Q1 2005Q2	
Adjusted sample: 1989Q1 2005Q2	
Included observations: 65	
Root Mean Squared Error	0.347807
Mean Absolute Error	0.257920
Mean Abs. Percent Error	1.486124
Theil Inequality Coefficient	0.009993
Bias Proportion	0.000182
Variance Proportion	0.131288
Covariance Proportion	0.868531



Notes:

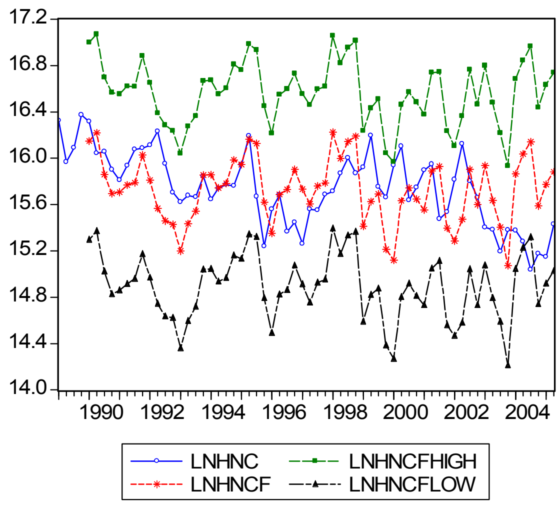
*-LNHAC=Apparel cottons raw data
-LNHACF=Forecasted LNHAC
-LNHACFHIGH=Upper bound (2+S.E) of LNHACF
- LNHACFHIGH=Lower bound (2-S.E) of LNHACF

Figure 2.d-Non-apparel cottons (HK)



Forecast: LNHNCF
Actual: LNHNC
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

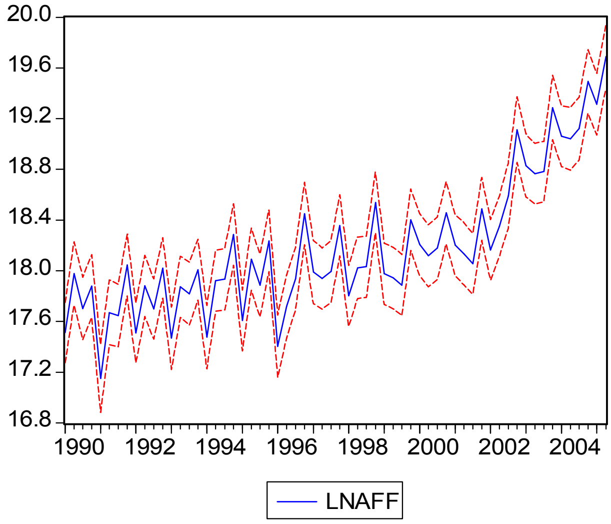
Root Mean Squared Error	0.385279
Mean Absolute Error	0.304733
Mean Abs. Percent Error	1.946193
Theil Inequality Coefficient	0.012248
Bias Proportion	0.000990
Variance Proportion	0.002642
Covariance Proportion	0.996368



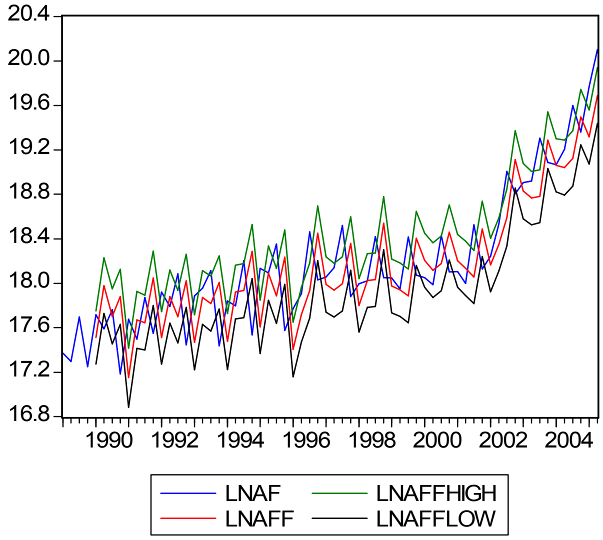
Notes:

*-LNHNC=Non-apparel cottons raw data
-LNHNCF=Forecasted LNHNCF
-LNHNCFHIGH=Upper bound (2+S.E) of LNHNCF
- LNHNCFHIGH=Lower bound (2-S.E) of LNHNCF

Figure 2.e-Apparel fibers (CHN)



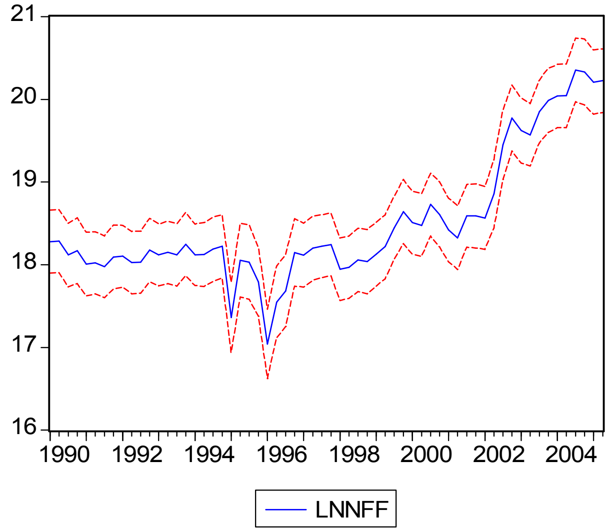
Forecast: LNAFF	
Actual: LNAF	
Forecast sample: 1989Q1 2005Q2	
Adjusted sample: 1989Q1 2005Q2	
Included observations: 62	
Root Mean Squared Error	0.362385
Mean Absolute Error	0.307638
Mean Abs. Percent Error	1.693568
Theil Inequality Coefficient	0.009949
Bias Proportion	0.015841
Variance Proportion	0.028046
Covariance Proportion	0.956113



Notes:

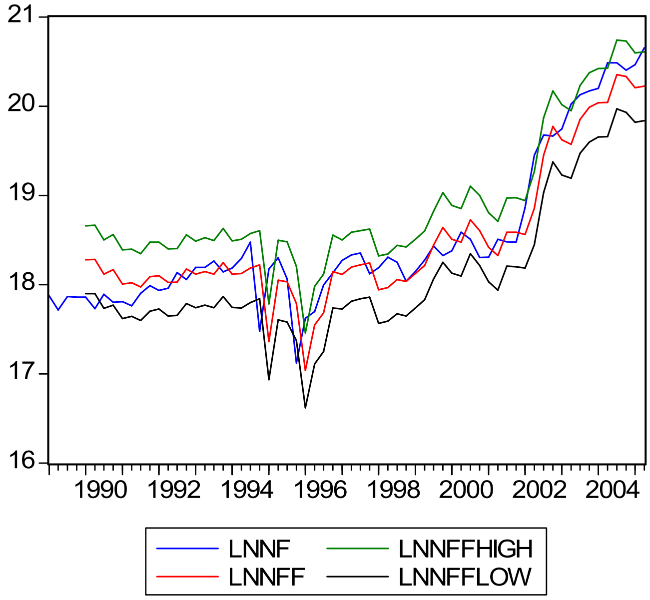
*-LNAF=Apparel fibers raw data
-LNAFF=Forecasted LNAF
-LNAFFHIGH=Upper bound (2+S.E) of LNAFF
-LNAFFHIGH=Lower bound (2-S.E) of LNAFF

Figure 2.f-Non-apparel fibers (CHN)



Forecast: LNNFF
Actual: LNNF
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

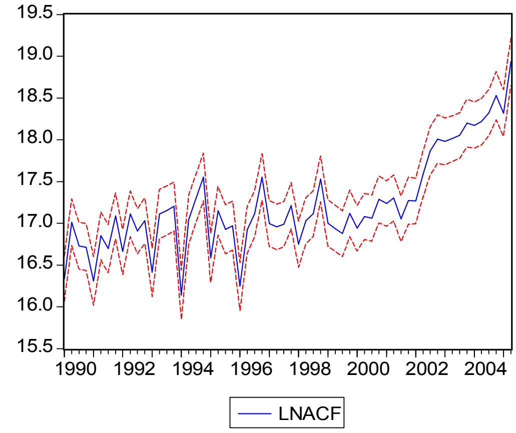
Root Mean Squared Error	0.288461
Mean Absolute Error	0.224179
Mean Abs. Percent Error	1.212878
Theil Inequality Coefficient	0.007776
Bias Proportion	0.022681
Variance Proportion	0.105457
Covariance Proportion	0.871863



Notes:

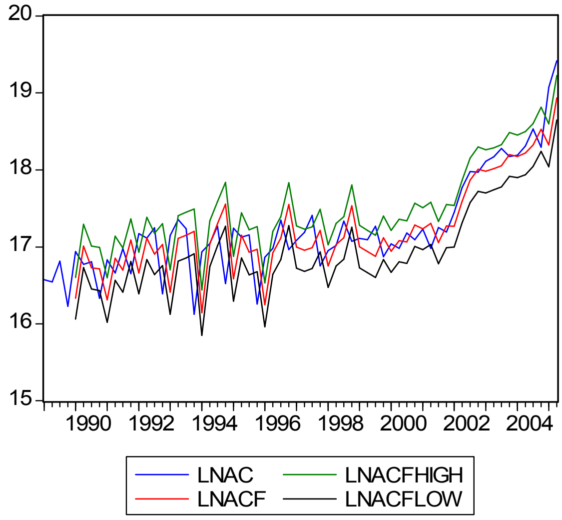
*-LNNF=Non-apparel fibers raw data
-LNNFF=Forecasted LNNF
-LNNFFHIGH=Upper bound (2+S.E) of LNNFF
- LNNFFHIGH=Lower bound (2-S.E) of LNNFF

Figure 2.g-Apparel cottons (CHN)



Forecast: LNACF
Actual: LNAC
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

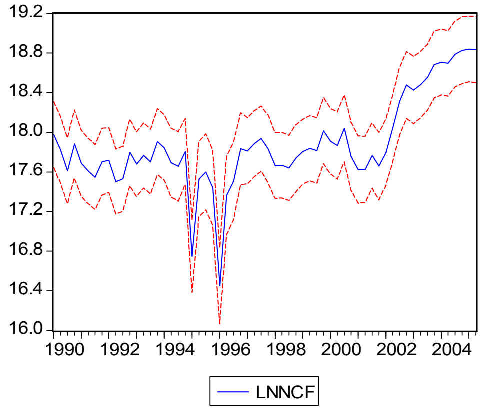
Root Mean Squared Error	0.390220
Mean Absolute Error	0.294304
Mean Abs. Percent Error	1.721052
Theil Inequality Coefficient	0.011302
Bias Proportion	0.017470
Variance Proportion	0.019725
Covariance Proportion	0.962805



Notes:

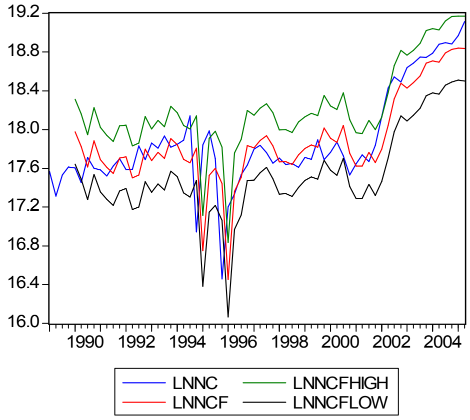
*-LNAC=Apparel cottons raw data
-LNACF=Forecasted LNAC
-LNACFHIGH=Upper bound (2+S.E) of LNACF
- LNACFHIGH=Lower bound (2-S.E) of LNACF

Figure 2.h-Non-apparel cottons (CHN)



Forecast: LNNCF
Actual: LNNC
Forecast sample: 1989Q1 2005Q2
Adjusted sample: 1989Q1 2005Q2
Included observations: 62

Root Mean Squared Error	0.302276
Mean Absolute Error	0.203188
Mean Abs. Percent Error	1.146573
Theil Inequality Coefficient	0.008446
Bias Proportion	0.006264
Variance Proportion	0.034080
Covariance Proportion	0.959656



Notes:

*-LNNC=Non-apparel cottons raw data
-LNNCF=Forecasted LNNC
-LNNCFHIGH=Upper bound (2+S.E) of LNNCF
- LNNCFHIGH=Lower bound (2-S.E) of LNNCF