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Sensitivity of the Global Textile & Clothing Trade Post-MFA

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Abstract: The objective of this study is to examine the sensitivity of textile and clothing imports and exports with respect to changes in GDP and vice versa, and the impact of phasing-out of the Multi-Fiber Agreement (MFA) on these. The study used a modified form of the gravity model, analysed using the univariate Analysis of Covariance (ANCOVA) model, considering five years pre-MFA phase-out and seven years post-MFA. The results of the study indicate that textile and clothing imports and exports are sensitive to changes in GDP and vice versa, and that the primary impact of quota removal was on the exporters, resulting in an increase in the sensitivity of volume of textile and clothing exports with respect to GDP. This result should be examined in more detail, in terms of the factors affecting the sensitivity of textile and clothing exports at the country level.

Keywords: Multi-Fiber Agreement (MFA), textile and clothing industry, modified gravity model, sensitivity of imports and exports.

JEL Classification: L10, L60, and L67.

INTRODUCTION

The textile and clothing industry has contributed significantly to the economic development of developing economies, and, in turn, the developing economies supply a major portion of textiles and clothing exports (Akalin, 2001). Since 1960, production of textiles and clothing has increasingly shifted to the developing economies, where labour is cheaper and more abundant. In response, developed economies had imposed restrictions on textile and clothing imports in order to protect their domestic textile and clothing industries.

The Multifiber Arrangement (MFA) was one such trade agreement that governed the global textile and clothing trade from 1974 to 2004. The MFA

was created to regulate the trade in textiles and clothing by imposing quotas on the imports of these goods into developed countries. The MFA allowed developed countries to restrict imports from developing countries to protect their domestic textile and clothing industries.

The MFA was criticised for being discriminatory towards developing countries, as it allowed developed countries to impose quotas on imports of textiles and clothing from developing countries, thereby limiting their market access. This created a barrier to entry for developing countries in the global textile and clothing trade, hindering their economic growth. Also, it was considered to be incompatible with the principles of the World Trade Organisation (WTO), which promotes free and fair trade between countries. The MFA was seen as a violation of the WTO's rules on trade in goods, which prohibit discriminatory trade practices. Finally, there was growing pressure from developing countries, international organisations, and non-governmental organisations (NGOs) to remove the MFA and replace it with a more equitable trade agreement.

As a result, the MFA was phased out, and it was replaced by the Agreement on Textiles and Clothing (ATC) in 1995 to regulate the global textile and clothing trade in a more transparent and non-discriminatory manner. The phasing out of the MFA allowed for the growth of the textile and clothing industries in developing countries, which benefited from increased access to markets previously restricted by quotas. Today, the global textiles and clothing trade is governed by the WTO's rules on trade in goods, which is more equitable than the MFA.

The objective of this study is to examine the sensitivity of textile and clothing imports and exports with respect to changes in GDP and vice versa, and the impact of phasing-out of the Multi-Fiber Agreement (MFA) on these.

LITERATURE REVIEW

Several studies have shown the impact of the MFA on exports of developing countries and on global welfare (Hamilton, 1990). With the phase-out of the MFA, there has been a dramatic increase in competition in the global textile and clothing market between countries like China, India, Bangladesh, Sri Lanka, and many others, in terms of price, value addition, delivery period, production capabilities, and flexibility.

Several studies have examined the global and regional impact of textile and clothing trade liberalisation; however, the findings of these studies are mixed

(Nordas, 2004). Most of the studies indicate that trade liberalisation has resulted in a significant increase in real income for developed and developing economies (Adhikari and Yamamoto, 2007; Whalley, 2007; Martin, 2007).

Tinbergen (1962) and Poyhonen (1963) proposed the gravity model as a way to explain bilateral trade patterns between European markets. The basic gravity model suggests that the magnitude of the trade flows between two economies is directly proportional to the product of their sizes (i.e. their demand/supply potential) and inversely proportional to the distance between them (due to transportation costs). The gravity model has been theoretically justified through arguments such as product specialisation, productivity differences, factor endowment differences, and differences in returns to scale (Anderson, 1979; Deardorff, 1995).

GDP is used to reflect aggregate demand in the case of an importer and aggregate supply in the case of an exporter. Thus, larger GDP in importing economies leads to greater demand, a part of which may come through imports; similarly, larger GDP in exporting countries leads to greater supply, part of which may be exported. Thus, economic growth can lead to growth in imports and exports.

The model was further extended to include other types of variables, such as trade agreements, cultural aspects, historical perspectives, geographical proximity, and political and institutional variables (Krugman and Obstfeld, 2003).

The gravity model has been applied extensively in empirical studies of international trade (Havrylyshin and Pritchett, 1991; Bayoumi and Eichengreen, 1995).

Fukao et al. (2003) studied the effects of the North American Free Trade Agreement (NAFTA) on trade diversion using a version of the gravity model, estimating the impacts of wages, tariffs and the inception of NAFTA on the change in shares of U.S.'s imports from different countries. They found evidence of some trade diversion in U.S. imports from Mexico due to NAFTA, especially in textiles and clothing, perhaps at the expense of trade with Asian countries. Also for textiles and clothing, they found that U.S. tariff rates against Canada and Mexico were decreased, whereas they were still high against many other countries. Subsequently, Datta and Kouliavtsev (2009) used a modified version of the partial-equilibrium gravity model to study the impact of labour wages, tariffs, and exchange rates on the changing pattern of US textile trade with the implementation of NAFTA. They did not find evidence of trade diversion due

to NAFTA; rather, they found evidence of trade creation. Further, they did not find a significant increase in the share of textile-exporting countries with lower wages in the total U.S. textile imports. On the other hand, they found that fluctuations in exchange rates and tariffs had significant impact on the composition of U.S. textile imports.

Bhattacharyya and Banerjee (2006) used a gravity model to study the determinants of India's trade patterns. They found that India trades more with developed rather than underdeveloped countries; further, colonial heritage still plays an important role in determining India's direction of trade. Also, they found that India's trade responds less than proportionally to size and more than proportionally to distance.

De (2010) analysed India's trade potential in the pre- and post- global financial crisis period using an augmented gravity model. He found that India's trade potential is highest in the Asia-Pacific, followed by Africa and Latin America. He also showed that tariff liberalisation and trade facilitation together could enhance the gravity effect in the post-crisis period.

De (2013) analysed the impact of barriers to trade on India's services trade flow using a gravity model, estimating that a 1% improvement in services trade facilitation measures would result in a 2% increase in India's service sector exports.

Eve and Au (2007) applied a gravity model to study the determinants of Chinese textile exports. They found that importer GDP and domestic GDP growth rate had positive impacts on textile exports, while the exchange rate had a negative impact.

Baroncelli (2007) applied a gravity model to estimate the impact of strained Indo-Pak relations on bilateral trade, and estimated that, in the absence of conflict, bilateral trade between India and Pakistan would have been $591 million in 2000, as against the recorded trade of $117 million. The study suggests a significant inverse relationship between conflict and trade. Similarly, Bhattacharya and Bhattacharyay (2007) applied a gravity model to estimate the impact of preferential trading arrangements and free trade arrangements between China and India. They found that in the short run India's potential gains are relatively less than those of China due to its high tariff structure; in the long run, however, India's will stand to gain more than China once its tariff levels are brought at par.

Medvedev (2010) examined the effect of preferential trade agreements (PTA) on bilateral trade using a gravity model and found that the semi-elasticity

of trade with respect to PTA membership increases from 87% when total trade between PTA partners is considered to 119% when preferential trade (trade in tariff lines where preferences are likely to matter) is considered.

Salim et al (2013) analysed the impact of the Gulf Cooperation Council Countries (GCC) on its member states using a standard augmented gravity model as well as a stochastic frontier gravity model. They found a significant trade-enhancing effect of the GCC and that there is still great untapped trade potential between member states.

Rasoulinezhad and Jabalameli (2018) studied the similarities of trade patterns among the BRICS economies using a panel gravity model approach, with disaggregated trade data of manufactured goods and raw materials of each BRICS economy with different regional groups. They found that the Linder hypothesis held for the BRICS economies, except for Russia, for which the Heckscher-Ohlin model held. Further, they found that China's dominance among the BRICS has resulted in a stronger impact of the yuan on Chinese trade than other currencies.

Thus, gravity models have been used widely in the literature to analyse gravity effects in international trade patterns and the impact of barriers and/or restrictions as well as trade agreements on trade patterns.

METHODOLOGY

The objective of this study is to examine the sensitivity of textile and clothing imports and exports with respect to changes in GDP and vice versa, and the impact of phasing-out of the Multi-Fiber Agreement (MFA) on these. This was analysed using a modified form of the gravity model.

The variables considered in the study include the total imports and exports of textiles and clothing from each of the major importing and exporting countries, as well was their respective Gross Domestic Products (GDP). The data for the study was collected from varied sources, including RBI's *Handbook of Statistics on Indian Economy*, World Bank's *Databank*, and WTO's *International Trade Statistics*. The study period was 2000-12, representing five years pre-MFA phase-out and seven years post-MFA phase-out.

In the present study, the total imports and exports of clothing and textiles of different countries is examined by modifying the gravity model. The modified model is as follows:

$$\ln(y_{it}) = a + bD + \Sigma c_i D_i + (d + d'D) * \ln(GDP_{it}) + \epsilon_{it}$$

The dependent variable y_{it} represents total imports/exports of clothing and textiles of different countries, while the independent variables include the post-MFA dummy variable D and country dummy variables D_i (for importer/exporter fixed effects), along with the logarithm of the GDP of the countries. The model was analysed using the univariate Analysis of Covariance (ANCOVA) technique. The focus of the analysis was on the coefficients d and d', which measure the sensitivity of imports/exports of clothing and textiles with respect to GDP, pre- and post- MFA phase-out. The coefficients c_i measure the country-specific differences in imports/exports of clothing and textiles. The constant term a represents the average level of imports/exports of clothing and textiles across the sample, while the coefficient b measures the change in the average level of imports/exports of clothing and textiles post-MFA phase-out. The analysis was also performed with dependent and independent variables interchanged, to analyse the percentage change in GDP with respect to unit percentage change in imports and exports of textiles and clothing.

ANALYSIS & FINDINGS: TREND ANALYSIS

The textile and clothing import and export trends of different countries globally during the pre- and post-MFA period is discussed in this section.

Tables 1 and 2 show the trend in textile and clothing imports of selected importing countries, respectively.

Table 1: Textile Imports of Selected Economies 2000-12 (in USD millions)

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
European Union (27)	48741	46594	54430	106865	68919	71642	76329	85563	85101	66721	73040	84606	74118
United States	16008	15429	16953	71277	20662	22538	23498	24089	23128	19211	23375	25359	25956
China	12832	12573	13060	1422	15304	15503	16358	16645	16289	14945	17667	18901	19810
Hong Kong, China	13717	12177	12065	15950	14110	13793	13975	13559	12313	9964	11265	11049	10364
Japan	5985	4939	4532	19485	5599	5812	6176	6297	6925	6742	7196	9195	9013
Turkey	2124	1921	2839	422	4170	4441	4686	6009	5646	4718	6540	7557	6441
Viet Nam	1276	1291	2071	369	2834	3435	3988	5139	5703	5469	5992	8702	9195
Mexico	6219	6022	5571	3034	5272	6043	5951	5640	5366	4197	5150	5859	6003
Bangladesh	1383	1485	1387	1485	1485	1634	1538	1206	1546	3639	5009	5562	5840
Korea, Republic of	3359	3067	3239	2547	3385	3541	3909	4140	4112	3536	4833	5658	4882
Indonesia	1251	1088	878	700	712	756	730	785	3262	2802	4236	5654	5570
Canada	4132	3814	3803	4501	4115	4312	4472	4431	4317	3569	4153	4502	4591
Russian Federation	1248	1435	1482	4360	2290	2871	3613	4408	5512	3525	3784	4439	4661
Brazil	112	982	851	154	1084	1599	1599	2183	2947	2584	3779	4303	4300
India	575	691	896	987	1394	1989	1972	2247	2386	2262	2693	3393	3318
Thailand	1631	1535	1576	156	1847	1986	2059	2160	2444	1913	2672	2982	3245
United Arab Emirates	1824	1694	2000	1189	3220	3253	3567	2605	2884	2321	2366	2707	3067

Source: WTO international Trade Statistics

Table 2: Clothing Imports of Selected Economies 2000-12 (in USD millions)

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
European Union (27)	80179	81002	89519	106865	123734	131496	144448	165320	180379	161390	164216	190746	170058
United States	67115	66391	66731	71277	75731	80071	82969	84851	82464	72059	81942	88584	87957
Japan	19709	19186	17601	19485	21687	22541	23831	23997	25793	25552	26867	32945	33942
Hong Kong, China	16008	16098	15701	15950	17129	18437	18852	19149	18546	15508	16645	17248	16338
Canada	3690	3926	4013	4501	5223	5975	6987	7613	8251	7560	8309	9532	9365
Russian Federation	2689	3030	3860	4360	6471	7928	8103	14505	12018	7250	7190	9238	9217
Switzerland	3223	3229	3449	4237	4359	4451	4654	5184	5805	5242	5285	6139	5721
Australia	1858	1638	1819	2190	2666	3120	3279	5184	4280	4058	4832	5838	6080
Korea, Republic of	1307	1631	2256	2547	2747	2913	3744	4318	4223	3379	4443	6110	6267
Turkey	264	239	283	422	651	788	1098	1566	2216	2147	2835	3272	2677
United Arab Emirates	1422	1550	1780	1189	1670	788	3055	2296	2777	2543	2598	3150	3569
China	1192	1274	1356	1422	1542	1629	1724	1976	2282	1842	2513	4012	4522
Norway	1287	1234	1361	1542	1666	1855	1977	2286	2565	2271	2507	2894	2668

Source: WTO international Trade Statistics

The EU's textile imports increased from 40% to 45% in the pre-quota period and then declined to 37% in the post-quota period. In the case of US and China the import trend remained more or less the constant in the period 2000-12. Developing countries had a small percentage increase in share of textile imports in the same period.

The European Union (EU) was the 'top importer' of clothing items, with its share increasing from 40% to 48% in the period from 2000-12, while United States' share decreased from 33% to 23%, and Japan's share remained more or less the constant in the same period.

Tables 3 and 4 show the trend in textile and clothing exports of selected exporting countries, respectively.

Table 3: Textile Exports of Selected Countries 2000-12 (in USD millions)

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
China	16135	16826	20563	26900	33428	45814	48683	55961	65361	59824	76900	94411	95450
European Union (27)	56456	51638	52961	64907	72232	69465	73844	81846	81111	62940	67108	76959	69366
India	5998	5375	6028	6846	7009	8285	8837	9667	10447	9111	12833	15340	15273
United States	10952	10491	10698	10886	11989	12379	12665	12426	12496	9931	12169	13790	13485
Hong Kong	13441	12244	12374	13087	14296	13830	13910	13476	12256	9976	12872	11283	10545
Korea	12710	10941	10713	10779	10839	10391	10110	10373	10371	9155	11307	12369	11969
Turkey	3672	3943	4244	5262	6428	7076	7585	8942	9396	7723	10968	10772	11054
Pakistan	4532	4525	4790	5811	6125	7087	7469	7371	7186	6510	7848	9082	8704
Japan	7023	6198	6030	6431	7138	6905	6934	7108	7373	6109	7086	8034	7818
Indonesia	3505	3202	2896	2923	2961	3353	3614	3829	3675	3208	4144	4791	4541
Thailand	1960	1888	1929	2161	2563	2764	2873	3114	3211	3002	3761	4072	3520
Mexico	2571	2091	2212	2096	2071	2138	2192	2215	1993	1611	1928	2140	2235
Canada	2204	2163	2183	2264	2431	2464	2369	2316	1992	1644	1907	2024	2018
World Trade	154860	146870	152760	172470	195541	205135	217992	240364	253359	209820	250652	294953	285668

Source: WTO international Trade Statistics

China increased its share in textile exports from 11% to 33% in the period 2000-12. On the other hand, in the same period the EU's share in the textile exports declined from 37% to 24%, and the US's share in textile exports decreased from 7% to less than 5%. Also, India's share in textile exports increased marginally from 4% to 5% in the same period.

The EU was the 'top exporter' in the year 2000, followed by China. The trend had significantly changed post-MFA. China's clothing export share increased from 18% to 38% during the period 2000-12, thus becoming a major beneficiary in the quota-free environment and overtaking EU's export share. On the other hand, India's share in clothing exports remained the constant in the same period, i.e. the quota-free environment has not much impacted on Indian clothing exports.

Table 4: Clothing Exports of Selected Economies 2000-12 (in USD millions)

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
European Union (27)	47421	48314	57958	68447	76887	79126	95388	105104	144314	98062	100177	116804	108896
China	36071	36650	41302	52061	61856	74163	91433	115233	120399	107264	129838	153774	159613
India	6030	5483	6037	6625	6632	9212	9465	9786	11495	12005	11246	14672	13832
Bangladesh	4244	4261	3947	4912	5686	7751	9634	8855	10920	12525	14855	19213	19948
Indonesia	4734	4531	3945	4105	4454	4959	5760	5870	6285	5915	6820	8045	7523
Turkey	6533	6661	8057	9962	11193	11183	12052	13886	13590	11555	12760	13948	14289
Vietnam	1821	1845	2633	3467	4441	4838	5579	7400	8724	8540	10839	13149	14068
United States	8629	7012	6032	5537	5059	4998	4876	4320	4449	4186	4694	5233	5613
Mexico	8631	8011	7751	7343	7490	7306	6323	5150	4911	4113	4363	4638	4448
Hong Kong	24214	23446	22430	23158	25097	27292	28391	28765	27908	22826	24049	24505	22572
World Trade	196780	193690	203038	232557	259147	277971	309593	345830	364914	315516	351464	416521	422685

Source: WTO international Trade Statistics

ANALYSIS & FINDINGS: ANALYSIS OF COVARIANCE (ANCOVA)

The results of the univariate ANCOVAs are presented in Tables 5-12 below.

Table 5: Sensitivity of textile imports with respect to GDP, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	-11.004	0.000
[importer=Australia]	-1.055	0.000
[importer=Canada]	-0.753	0.000
[importer=China]	-2.618	0.000
[importer=European Union]	0.476	0.000
[importer=Hong Kong, China]	1.600	0.000
[importer=Japan]	-0.413	0.001
[importer=Korea, Republic of]	-1.190	0.000
[importer=Norway]	-0.959	0.001
[importer=Russian Federation]	-0.443	0.047
[importer=Switzerland]	-0.335	0.207
[importer=Turkey]	-1.925	0.000
[importer=United Arab Emirates]	-0.576	0.073
[importer=United States]	0[a]	
[post-MFA=0]	0.235	0.759
[post-MFA=1]	0[a]	
ln(GDP)	0.740	0.000
[post-MFA=0] * ln(GDP)	-0.014	0.604
[post-MFA=1] * ln(GDP)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	430.659	0.000
Intercept	32.926	0.000
importer	246.406	0.000
post-MFA	0.095	0.759
ln(GDP)	102.013	0.000
post-MFA * ln(GDP)	0.270	0.604
R^2	97.7%	

The model was found to be statistically significant, explaining 97.7% of the variation in textile imports, with significant differences between the importing countries. There was significant impact of GDP on textile imports, with a 1% increase in GDP resulting in a 0.740% increase in textile imports on average. There was no significant difference in this impact post-MFA.

Table 6: Sensitivity of GDP with respect to textile imports, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	25.002	0.000
[importer=Australia]	-1.296	0.000
[importer=Canada]	-1.154	0.000
[importer=China]		
0.362	0.106	
[importer=European Union]	-0.177	0.040
[importer=Hong Kong, China]	-3.495	0.000
[importer=Japan]	-0.462	0.000
[importer=Korea, Republic of]	-1.131	0.000
[importer=Norway]	-1.891	0.000
[importer=Russian Federation]	-1.526	0.000
[importer=Switzerland]	-1.992	0.000
[importer=Turkey]	-1.143	0.000
[importer=United Arab Emirates]	-2.379	0.000
[importer=United States]	0[a]	
[post-MFA=0]	-.952	0.000
[post-MFA=1]	0[a]	
ln(textile imports)	0.465	0.000
[post-MFA=0] * ln(textile imports)	-0.074	0.001
[post-MFA=1] * ln(textile imports)	0[a]	
Source	F Stat	p-value
Corrected Model	561.431	0.000
Intercept	2272.179	0.000
importer	323.064	0.000
post-MFA	19.700	0.000
ln(textile imports)	81.491	0.000
post-MFA * ln(textile imports)	10.621	0.001
R^2	98.2%	

The model was found to be statistically significant, explaining 98.2% of the variation in GDP, with significant differences between the importing countries. There was significant impact of textile imports on GDP, with a 1% increase in textile imports resulting in a 0.465% increase in GDP on average. There was significant difference in this impact pre-MFA, with 1% increase in textile imports resulting in a 0.391% increase in GDP on average.

Table 7: Sensitivity of clothing imports with respect to GDP, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	-13.648	0.000
[importer=Bangladesh]	-0.545	0.002
[importer=Brazil]	-3.360	0.000
[importer=Canada]	-2.277	0.000
[importer=China]	-1.971	0.000
[importer=European Union]	-1.677	0.006
[importer=Hong Kong, China]	0.459	0.025
[importer=India]	-3.015	0.000
[importer=Indonesia]	-2.230	0.000
[importer=Japan]	-2.987	0.000
[importer=Korea, Republic of]	-2.105	0.000
[importer=Mexico]	-1.805	0.000
[importer=Russian Federation]	-2.277	0.000
[importer=Thailand]	-1.655	0.000
[importer=Turkey]	-1.581	0.000
[importer=United Arab Emirates]	-1.230	0.000
[importer=United States]	-2.726	0.000
[importer=Viet Nam]	0[a]	
[post-MFA=0]	-1.551	0.160
[post-MFA=1]	0[a]	
ln(GDP)	0.873	0.000
[post-MFA=0] * ln(GDP)	-0.056	0.158
[post-MFA=1] * ln(GDP)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	74.683	0.000
Intercept	29.828	0.000
importer	42.852	0.000
post-MFA	1.985	0.160
ln(GDP)	68.529	0.000
post-MFA * ln(GDP)	2.005	0.158
R^2	87.6%	

The model was found to be statistically significant, explaining 87.6% of the variation in clothing imports, with significant differences between the importing countries. There was significant impact of GDP on clothing imports,

with a 1% increase in GDP resulting in a 0.873% increase in clothing imports on average. There was no significant difference in this impact post-MFA.

Table 8: Sensitivity of GDP with respect to clothing imports, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	22.713	0.000
[importer=Bangladesh]	0.266	0.008
[importer=Brazil]	3.041	0.000
[importer=Canada]	2.759	0.000
[importer=China]	3.361	0.000
[importer=European Union]	4.415	0.000
[importer=Hong Kong, China]	0.604	0.000
[importer=India]	2.827	0.000
[importer=Indonesia]	1.901	0.000
[importer=Japan]	3.968	0.000
[importer=Korea, Republic of]	2.485	0.000
[importer=Mexico]	2.429	0.000
[importer=Russian Federation]	2.507	0.000
[importer='Thailand]	1.340	0.000
[importer=Turkey]	1.878	0.000
[importer=United Arab Emirates]	1.143	0.000
[importer=United States]	4.663	0.000
[importer=Viet Nam]	0[a]	
[post-MFA=0]	-0.386	0.172
[post-MFA=1]	0[a]	
ln(clothing imports)	0.299	0.000
[post-MFA=0] * ln(clothing imports)	-0.011	0.730
[post-MFA=1] * ln(clothing imports)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	463.561	0.000
Intercept	6330.209	0.000
importer	300.961	0.000
post-MFA	1.878	0.172
ln(clothing imports)	62.792	0.000
post-MFA * ln(clothing imports)	0.119	0.730
R^2	97.8%	

The model was found to be statistically significant, explaining 97.8% of the variation in GDP, with significant differences between the importing countries. There was significant impact of clothing imports on GDP, with a 1% increase in clothing imports resulting in a 0.299% increase in GDP on average. There was no significant difference in this impact post-MFA.

Table 9: Sensitivity of textile exports with respect to GDP, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	-11.243	0.000
[exporter=Canada]	-0.105	0.407
[exporter=China]	2.259	0.000
[exporter=European Union]	1.677	0.000
[exporter=Hong Kong, China]	2.880	0.000
[exporter=India]	1.437	0.000
[exporter=Indonesia]	1.156	0.000
[exporter=Japan]	0.163	0.033
[exporter=Korea, Republic of]	1.720	0.000
[exporter=Mexico]	0.049	0.723
[exporter=Pakistan]	2.494	0.000
[exporter=Thailand]	1.257	0.000
[exporter=Turkey]	1.682	0.000
[exporter=United States]	0[a]	
[post-MFA=0]	1.310	0.004
[post-MFA=1]	0[a]	
ln(GDP)	0.683	0.000
[post-MFA=0] * ln(GDP)	-0.044	0.006
[post-MFA=1] * ln(GDP)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	551.045	0.000
Intercept	52.928	0.000
exporter	471.786	0.000
post-MFA	8.695	0.004
ln(GDP)	203.887	0.000
post-MFA * ln(GDP)	7.665	0.006
R^2	98.2%	

The model was found to be statistically significant, explaining 98.2% of the variation in textile exports, with significant differences between the exporting

countries. There was significant impact of GDP on textile exports, with a 1% increase in GDP resulting in a 0.683% increase in textile exports on average. There was significant difference in this impact pre-MFA, with 1% increase in GDP resulting in a 0.639% increase in textile exports on average.

Table 10: Sensitivity of GDP with respect to textile exports, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	22.130	0.000
[exporter=Canada]	-0.891	0.000
[exporter=China]	-2.606	0.000
[exporter=European Union]	-1.459	0.000
[exporter=Hong Kong, China]	-4.293	0.000
[exporter=India]	-2.344	0.000
[exporter=Indonesia]	-2.485	0.000
[exporter=Japan]	-0.572	0.000
[exporter=Korea, Republic of]	-2.640	0.000
[exporter=Mexico]	-1.135	0.000
[exporter=Pakistan]	-4.113	0.000
[exporter=Thailand]	-2.786	0.000
[exporter=Turkey]	-2.853	0.000
[exporter=United States]	0[a]	
[post-MFA=0]	-0.703	0.007
[post-MFA=1]	0[a]	
ln(textile exports)	0.872	0.000
[post-MFA=0] * ln(textile exports)	-0.043	0.137
[post-MFA=1] * ln(textile exports)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	838.979	0.000
Intercept	1111.700	0.000
exporter	709.287	0.000
post-MFA	7.614	0.007
ln(textile exports)	184.948	0.000
post-MFA * ln(textile exports)	2.237	0.137
R^2	98.8%	

The model was found to be statistically significant, explaining 98.8% of the variation in GDP, with significant differences between the exporting countries. There was significant impact of textile exports on GDP, with a 1% increase in textile exports resulting in a 0.872% increase in GDP on average. There was no significant difference in this impact post-MFA.

Table 11: Sensitivity of clothing exports with respect to GDP, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	-9.530	0.000
[exporter=Bangladesh]	0.311	0.001
[exporter=China]	-0.176	0.567
[exporter=European Union]	-1.321	0.002
[exporter=Hong Kong, China]	0.741	0.000
[exporter=India]	-1.507	0.000
[exporter=Indonesia]	-1.279	0.000
[exporter=Mexico]	-1.876	0.000
[exporter=Turkey]	-0.771	0.000
[exporter=United States]	-4.021	0.000
[exporter=Vietnam]	0[a]	
[post-MFA=0]	-2.010	0.002
[post-MFA=1]	0[a]	
ln(GDP)	0.730	0.000
[post-MFA=0] * ln(GDP)	-0.076	0.002
[post-MFA=1] * ln(GDP)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	224.741	0.000
Intercept	29.894	0.000
exporter	226.992	0.000
post-MFA	9.647	0.002
ln(GDP)	98.855	0.000
post-MFA * ln(GDP)	10.466	0.002
R^2	95.8%	

The model was found to be statistically significant, explaining 95.8% of the variation in clothing exports, with significant differences between the exporting countries. There was significant impact of GDP on clothing exports, with a 1% increase in GDP resulting in a 0.730% increase in clothing exports on average. There was significant difference in this impact pre-MFA, with 1% increase in GDP resulting in a 0.654% increase in clothing exports on average.

Table 12: Sensitivity of GDP with respect to clothing exports, pre- and post-MFA

Parameter	*Coefficient*	*p-value*
Intercept	20.181	0.000
[exporter=Bangladesh]	-0.105	0.224
[exporter=China]	2.225	0.000
[exporter=EU]	3.751	0.000
[exporter=Hong Kong]	0.127	0.300
[exporter=India]	2.347	0.000
[exporter=Indonesia]	1.685	0.000
[exporter=Mexico]	2.520	0.000
[exporter=Turkey]	1.521	0.000
[exporter=United States]	5.255	0.000
[exporter=Vietnam]	0[a]	
[post-MFA=0]	-0.504	0.152
[post-MFA=1]	0[a]	
ln(clothing exports)	0.572	0.000
[post-MFA=0] * ln(clothing exports)	-0.011	0.760
[post-MFA=1] * ln(clothing exports)	0[a]	
Source	*F Stat*	*p-value*
Corrected Model	834.851	0.000
Intercept	1527.794	0.000
exporter	846.877	0.000
post-MFA	2.077	0.152
ln(clothing exports)	94.523	0.000
post-MFA * ln(clothing exports) 0.094	0.760	
R^2	98.8%	

The model was found to be statistically significant, explaining 98.8% of the variation in GDP, with significant differences between the exporting countries. There was significant impact of clothing exports on GDP, with a 1% increase in clothing exports resulting in a 0.572% increase in GDP on average. There was no significant difference in this impact post-MFA.

DISCUSSION

The results of the study indicate a significant gravity effect on clothing and textile imports and exports, i.e. clothing and textile imports and exports are

sensitive to changes in GDP. Also, the results of the study indicate a significant impact of clothing and textile imports and exports on GDP. An interesting extension would be to examine causality between clothing and textile imports and exports and GDP.

The results of the study also indicate that the primary impact of MFA phase-out was on the exporters, resulting in an increase in the sensitivity of volume of clothing and textile exports with respect to GDP. This result should be examined in more detail, in terms of the factors affecting the sensitivity of clothing and textile exports at the country level.

There are some limitations inherent in the study. The study period was very short and was possibly contaminated by the global financial crisis. Thus, the results of the study may not be generalisable. The study should be extended once a longer data period becomes available, so that the effects of the global financial crisis are mitigated. Of course, the Covid-19 pandemic may also adversely affect the sensitivity of clothing and textile imports and exports with respect to GDP.

Also, the model considered only GDP as the covariate. A question arises as to whether GDP per capita is more appropriate to capture the "gravity effect," or perhaps production levels. Also, other macroeconomic factors affecting imports and exports, such as exchange rates, interest rates, and inflation (as suggested by the Fisher effect), should also be incorporated to improve the scope of the model.

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