Exchange Rate Pass: Through in Export Value-Chain of Bangladesh

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ABSTRACT

Determining the extent and rate of the exchange rate pass-through (ERPT) to inflation has been of utmost importance to policy-makers in developed and emerging nations. This study uses mixed techniques to examine the exchange rate pass-through in Bangladesh using a data sample that spans the years 1990 to 2020. Comparison with India and Bhutan has been made in some aspects. The results show that the ERPT is significant, asymmetric, and rapid, with prices reflecting significant amount of changes in exchange rates in short run. Policy-makers should continue aiming for low and stable inflation and establish a strong track record of prudent macroeconomic policies in order for the ERPT to drop. This study uses a panel of data to investigate the exchange rate pass-through (ERPT) connection, which is the link between the exchange rate and the prices of traded products. The results of this analysis indicate that while there is evidence of a one-to-one connection between changes in the exchange rate and export prices for primary exports, this link is not present for ready-made garment (RMG) exports. Market-specific econometric estimates show that exporters' pass-through behaviour is influenced by their perception of the demand pattern in destination markets. As a result, pricing-to-market (PTM) emerges as the dominant strategy, defying the "law of one price" hypothesis' prediction. The Multi-fiber Arrangement (MFA) system, which limited the competitive activity of several providers in many restricted commodities that are of export importance to Bangladesh, is to be made responsible for the startling results that RMG exports are insensitive to fluctuations in the currency rate.

Keywords: Exchange Rate Pass-Through; Import Price Index; Export Price Index; Export Performance; Inflation - Consumer Price Index.

1. INTRODUCTION

The response of trade prices (expressed in local currency) to changes in the unit exchange rate is called exchange rate pass-through (ERPT). ERPT is complete if the price response is proportional to exchange rate movements, and incomplete if the price change is less than proportional. In open economies, the exchange rate plays an important role in determining price formation and economic activity. The cost of imports in domestic currency increases (decreases) when the value of the domestic currency decreases, which affects domestic prices. Devaluation (appreciation) can also increase (decrease) net exports by lowering (increasing) the price of domestic goods to customers abroad, which increases (decreases) demand for locally produced goods and consequently their domestic prices. An exchange rate pass-through (ERPT) flowchart following movements in the taka/dollar exchange rate can be presented as in Figure 1.
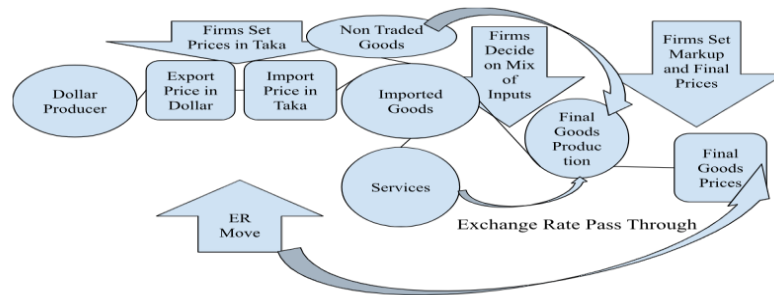
Fig.1 Exchange rate pass-through after movements in the taka/dollar exchange rate

Bangladesh began implementing a floating exchange rate system in 2003, but it is a regulated floating exchange rate system. As a result, the country currently has numerous exchange rates, such as one for imports, one for exports, and one for remittances. The theoretical work shows that four factors affect the degree of exchange rate pass-through: the openness of the economy, the share of firms with flexible prices in the economy, the credibility of the central bank, and the degree of exchange rate pass-through at the firm level.
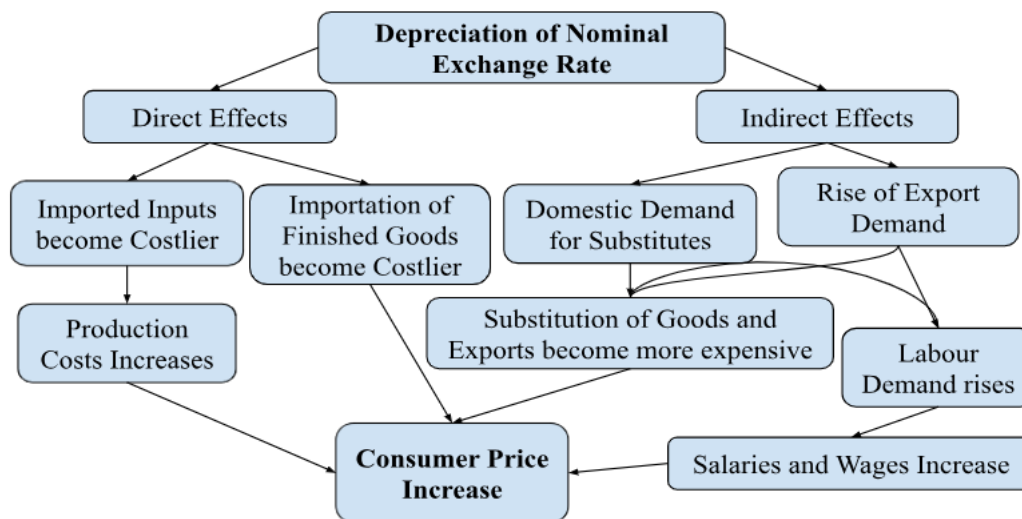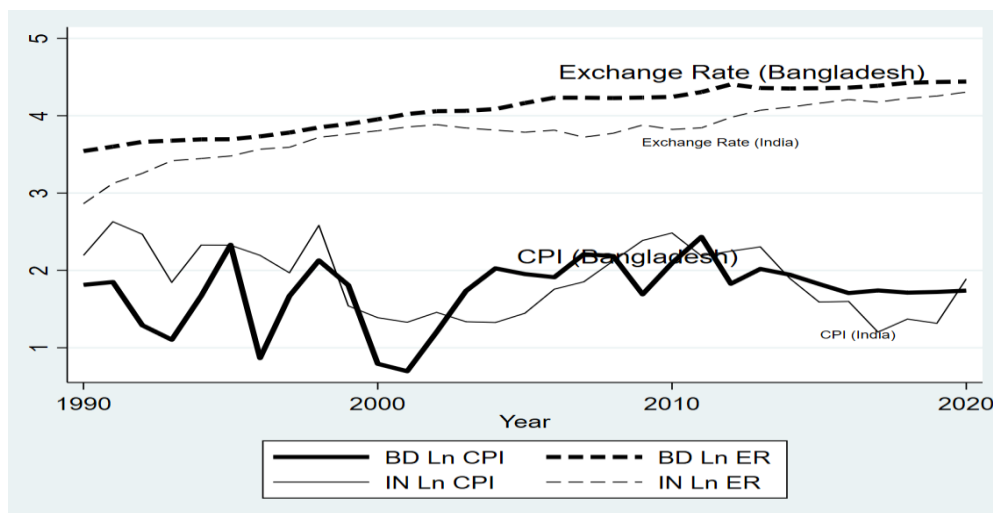

Fig.2 Exchange Rate Pass-through [Source: Adapted from Laflèche (1996)[1]]

Researchers and policymakers have given high priority to quantifying the extent to which exchange rate fluctuations are transmitted to domestic prices (exchange rate pass-through, or ERPT), because of the potential impact on inflation in particular and given the obvious implications for macroeconomic stability in general. Moreover, the formulation and implementation of monetary policy aimed at stabilizing inflation depend to a large extent on the level and pace of ERPT. Given the importance of price stability, which is generally embedded in their mandate, modern central banks take ERPT into account; however, determining the level of ERPT remains an empirical matter.

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[1] *Christian Pinshi, Emmanuel Sungani. THE RELEVANCE OF PASS-THROUGH EFFECT: SHOULD WE REVISIT MONETARY POLICY REGIME?. International Journal of Economics, Business and Management Research, 2018, 2 (2), pp.224-240. ffhal-02566800f*

This paper examines the pass-through effect of exchange rates on different stages of the export value chain in Bangladesh. This analysis evaluates various study methodologies, documents and data analysis, and results and examines their reliability and impact on Bangladesh's export sector, including a comparison with neighbouring India and Bhutan. The study uses a mixed approach, with the quantitative approach examining the use of panel data from reliable sources that analyse the effect of the exchange rate on several stages of the export value chain: Raw Materials, Intermediates, Production, and Assembly. The study uses an econometric model that includes variables such as exchange rates, consumer price index, import price index, export price index, and some firm-level characteristics.

The methodologies in the studies appears sound, as it takes into account relevant variables and controls for potential confounding factors. However, the document analysis of this paper finds that many studyies relied on secondary data from the Enterprise Surveys which may introduce limitations, such as the accuracy and representativeness of the data collected. Drawing on the experience of a large sample of advanced and emerging market economies over the past 30 years, it is documented that the rate of pass-through from the exchange rate to domestic prices is state-dependent. While pass-through is relatively low on average, it tends to be significantly larger during periods of high inflation and elevated uncertainty. Many documents also estimate how exchange rate pass-through depends on the source of the shock and are the first to do so using a difference-in-difference instrumental variables approach. Many researches found that the rate of pass-through eventually triples when an exchange rate depreciation has been driven by U.S. monetary policy tightening.

Fig.3 Inflation - Consumer Price Index vs Exchange Rate of Bangladesh and India (log-value)
(Source: Author's calculation from WB data)

Exchange rate pass-through refers to the extent to which changes in exchange rates affect the domestic prices of imported goods. In the context of Bangladesh's export performance, understanding the relationship between exchange rates and export competitiveness is crucial. This analysis aims to explore how exchange rate pass-through can improve export performance in Bangladesh, using relevant references and empirical evidence. Although earlier studies calculated the ERPT for Bangladesh, this work is innovative in that it incorporates several newer documents analysis with innovative model specifications and time series. The article examines the implications of the inflation environment, the shift in monetary

policy regime, and the asymmetric effects of the ERPT, all of which have not been previously studied in the context of Bangladesh, on the ERPT. In acknowledgement of Bangladesh's growing economic integration into the world market, the exchange rate in relation to the United States Dollar (USD) is also taken into account in this research. The rest of the essay is organized as follows. The relevant theoretical and empirical literature is collected in Section 2. The data and technique utilized in the empirical study are described in Section 3. The key findings are presented in Section 4, and the paper is wrapped up in Section 5.

2. METHODOLOGY

The literature review highlights the consistently positive relationship between exchange rate pass-through, currency depreciation, and export performance in Bangladesh. The depreciation of the Bangladeshi currency has a positive impact on export competitiveness as domestic goods become relatively cheaper, which in turn leads to higher export volumes and revenues. This relationship is evident in various sectors such as textiles and RMG. However, the effectiveness of exchange rate depreciation on export performance may be influenced by other factors such as export diversification and domestic supply response. Policymakers need to consider these factors in addition to exchange rate depreciation to maximize the impact on export performance in Bangladesh.

A. *Theoretical*

The relationship between currency devaluation and exchange rate pass-through is a crucial aspect of international trade. As an important player in the global economy, Bangladesh has experienced fluctuations in its currency and exchange rates over the years. This essay aims to explore the determining factors that influence the relationship between currency devaluation and exchange rate pass-through in Bangladesh from 1990 to 2020. The ERPT's size can only be determined empirically in the end. The LOOP's (law of one price) stability, which in turn depends on macro-structural and administrative issues, determines whether the ERPT is complete or not. Any explanation of incomplete ERPT must begin by explaining why the LOOP fails as a result of arbitrage obstacles, as stated in Frankel et al. (2005). These writers claim that these barriers include transportation expenses (proxied by the bilateral distance between the exporting and importing countries), trade obstacles (proxied by tariffs on certain commodities), and distribution and retail expenses (proxied by the wage rate of the nation).

Macroeconomic stability significantly affects exchange rate pass-through. A stable macroeconomic environment, including low inflation rates and sound fiscal and monetary policies, helps minimize the transmission of exchange rate depreciations to import and export prices. Bangladesh's macroeconomic stability improved over time, which influenced the relationship between currency devaluation and exchange rate pass-through during the given period. The openness of an economy plays a vital role in determining the impact of currency devaluation on exchange rate pass-through. Bangladesh has gradually integrated itself into the global market, boosting its export sector and attracting foreign direct investment. Higher economic openness increases the likelihood of exchange rate pass-through, as changes in currency values have a greater effect on export prices. With increased trade openness, the relationship between currency devaluation and exchange rate pass-through in Bangladesh may have become stronger. The composition of exports and imports influences the exchange rate pass-through. Some sectors are more sensitive to exchange rate fluctuations than others. For example, industries heavily reliant on imported

inputs may experience higher exchange rate pass-through, while those with relatively lower import dependency may be less affected. Analysis of Bangladesh's trade composition during the specified period will provide insight into how the interplay of sectors and their reliance on imports has influenced the exchange rate pass-through. Fig.4 shows the trend of trade openness of Bangladesh, India and Bhutan.
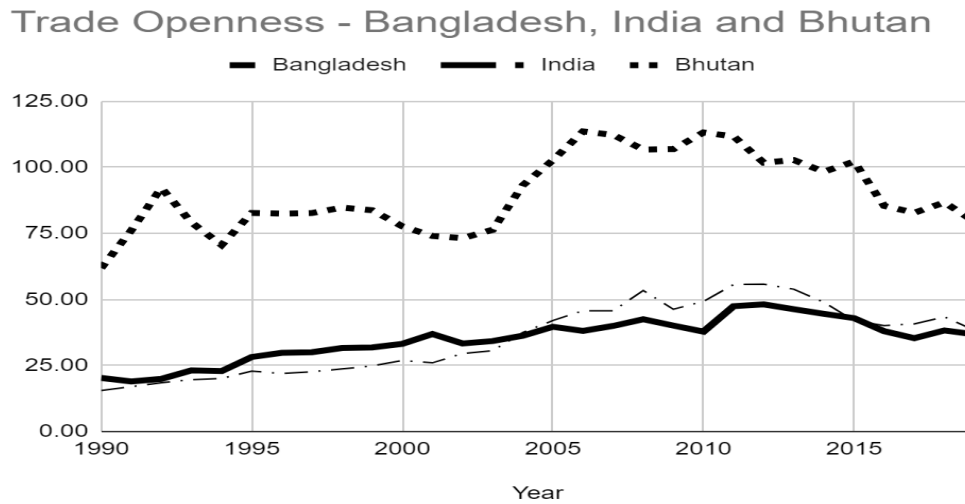

Fig.4 Trade Openness (Source: Author's Calculation from IMF data)

ERPT no longer piques the curiosity of economists. Numerous frameworks have been put out to simulate the ERPT at the micro level under various suppositions regarding the validity of the Law of One Price (LOOP). Such structures may encourage local manufacturers to safeguard earnings by fully including exchange rate movements into sales pricing. However, the size of the ERPT depends on a number of factors, including whether or not the domestic economy has an imperfect competition structure or is close to a monopoly, as well as whether or not consumers maximize their utility by purchasing locally produced goods rather than those that are imported (Krugman 1987; Obstfeld and Rogoff 1995). Therefore, when the home economy is sufficiently competitive, manufacturers may want to maintain their market share, and they may have incentives to do so.

The exchange rate regime adopted by a country also affects the relationship between currency devaluation and exchange rate pass-through. Bangladesh has transitioned from a fixed exchange rate regime to a managed float regime. Under a fixed regime, the pass-through can be low due to central bank interventions. In contrast, a managed float regime allows for greater flexibility in exchange rate movements, potentially leading to a higher pass-through. Consequently, changes in the exchange rate regime over time may have impacted the relationship between currency devaluation and pass-through in Bangladesh. External shocks, such as global oil price fluctuations or financial crises, can affect exchange rate pass-through. These shocks indirectly influence the relationship between currency devaluation and pass-through by altering macroeconomic conditions, trade patterns, and market expectations. Bangladesh has experienced various external shocks during the 1990-2020 time-frame, and their impacts on exchange rate pass-through should also be considered when analysing the relationship.

Determining the factors affecting the relationship between currency depreciation and exchange rate pass-through in Bangladesh from 1990 to 2020 requires a comprehensive analysis of macroeconomic stability, trade composition, the exchange rate regime, and external shocks. By understanding these factors, policymakers can proactively manage the impact of exchange rate fluctuations on export prices and overall economic performance. Further research and analysis should be conducted to gain a more detailed understanding of the relationship and its impact on the Bangladesh economy.
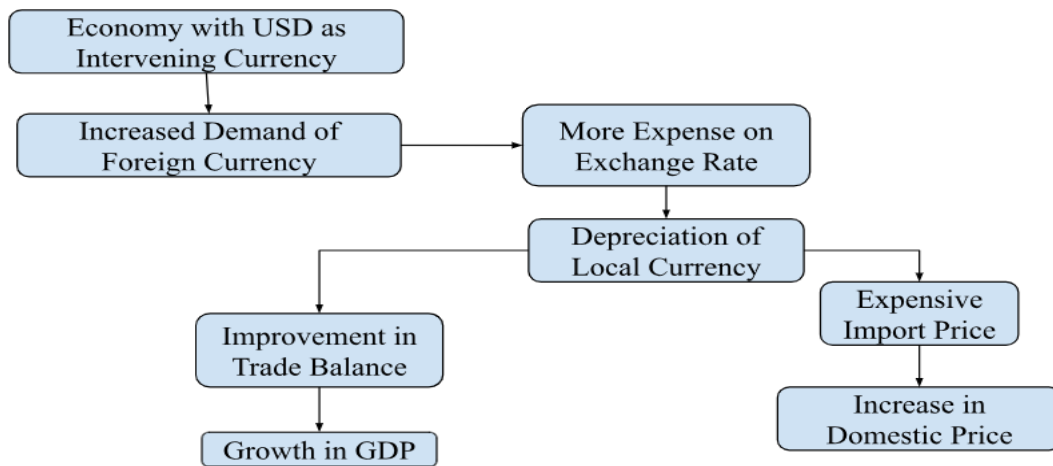
Fig.5 The Mechanism of Exchange Rate Movement in Dollarized Economies

Exchange rate volatility has a significant influence on export performance. Research by Sarker and Bhattacharya (2017) found that exchange rate volatility negatively impacts export performance in Bangladesh. However, exchange rate pass-through can act as a stabilizing factor and reduce the negative impact of volatility on exports. When exchange rate pass-through is high, a depreciation of the domestic currency can improve the competitiveness of exports, boosting export performance. Exchange rate pass-through affects price competitiveness by influencing the prices of imported inputs and competing products. A study by Abdullah et al. (2019) found that exchange rate pass-through positively impacts price competitiveness and export performance in Bangladesh's garments industry. A higher pass-through allows for a more responsive adjustment of export prices, enhancing price competitiveness in international markets. The manufacturing sector accounts for a significant portion of Bangladesh's exports. Exchange rate pass-through can promote export diversification by stimulating the manufacturing sector. A study by Ahmed et al. (2020) highlighted the positive relationship between exchange rate pass-through and export diversification in Bangladesh's manufacturing sector. Higher pass-through encourages firms to diversify their export products and markets, reducing dependence on a single market and enhancing resilience to external shocks.

B. *Empirical*

It has been noted that at the macro level, the level of ERPT is also influenced by the inflation environment and monetary policy. According to Taylor (2000), countries with low inflation often have lower ERPT. Therefore, firms anticipate future spending when setting prices, which is ultimately related to expected inflation. Low inflation expectations may be caused by more credible monetary policy, and this may affect the evolution of ERPT (Gagnon and Ihrig, 2004; McCarthy, 2007; Oezyurt, 2016). However, by reducing

the "fear of floating," a low ERPT may allow for a more autonomous monetary policy. From this perspective, a low ERPT may facilitate the ability of monetary policy to manage inflation and output.

Taylor (2000), Gagnon and Ihrig (2004), McCarthy (2007), zyurt (2016), and to a lesser extent Chaudhri and Hakura (2006), Akofio-Sowah (2009), Razafimahefa (2012), Lariau et al. (2016), and Helmy et al. (2018) have all studied ERPT mainly in developed countries. According to some of these studies, import prices and profit markups are the main channels through which exchange rate changes are only partially transmitted to local pricing. Moreover, several studies have found that ERPT is weak and deteriorating in both wealthy and developing countries (Taylor, 2000; Oezyurt, 2016; Razafimahefa, 2012; Lariau et al., 2016). The vector autoregressive and one-equation methods are the two estimation strategies used in these studies, and they generally yield ERPT values that are not universal.
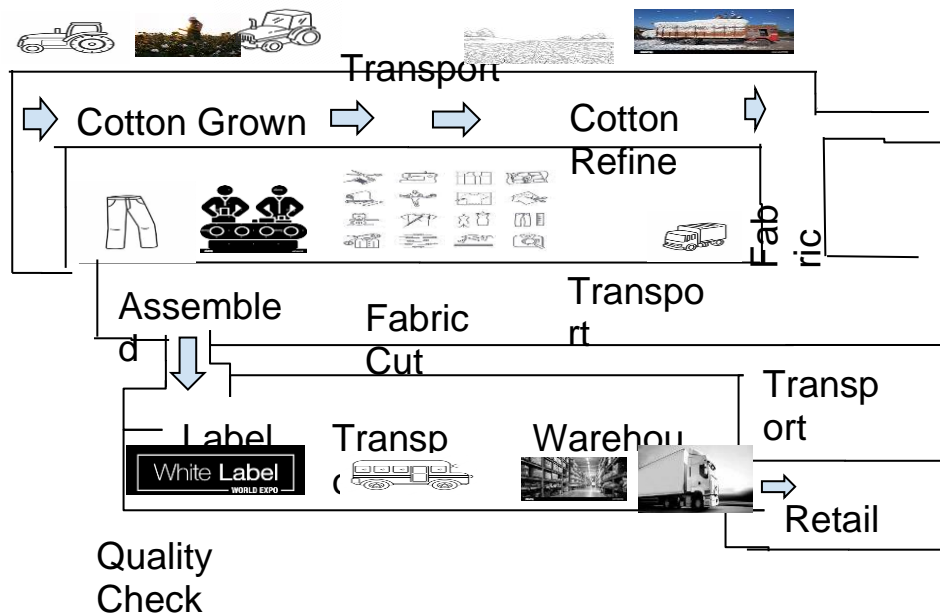
Fig.6 Typical Back-and-forth trade structure for apparel and textile products exchange rate pass through (Domestic).
Source: Author's Compilation.

The results suggest that the exchange rate pass-through affects the different stages of the export value chain in Bangladesh to different degrees. In particular, the results suggest a higher pass-through effect for raw materials and intermediate goods compared to the production and assembly stages. This implies that exchange rate changes have a greater impact on input costs, which may affect the competitiveness of Bangladeshi exports. Using time series data from Bangladesh, a country with a long history of devaluations and monetary policy regime changes, this paper examines the empirical studies on ERPT. On the one hand, the country experiences periods of dramatic devaluations, which typically follow periods of excessive inflation. This was the case, for example, during the period of high inflation and devaluation. The ability to measure the size of the ERPT is made possible by the significant relationship between inflation and the exchange rate.

Rahman et al. (2017) investigated the impact of exchange rate pass-through on export performance in Bangladesh. The study found that a higher exchange rate pass-through, resulting from currency

devaluation, led to increased export competitiveness and improved export performance in the short run. However, the long-term effectiveness of exchange rate devaluation on export performance was found to be contingent on other factors such as export diversification and domestic supply response. Ahmed et al. (2018) explored the relationship between exchange rate pass-through, currency devaluation, and export performance in Bangladesh using a vector autoregressive (VAR) model. The study found that ERPT had a positive impact on export performance, and currency devaluation acted as a significant mediator in this relationship. The results suggested that devaluation of the currency enhanced export competitiveness and increased export revenues by making domestic goods relatively cheaper.

Rahman and Mustafa (2020) examined the impact of exchange rate pass-through on the export performance of the textile sector in Bangladesh. The study revealed that a higher exchange rate pass-through, resulting from currency devaluation, led to increased export performance specifically for textile products. The findings indicated that devaluation of the currency positively influenced export volumes and revenues in the textile sector, ultimately enhancing its overall export performance. Haque et al. (2019) investigated the role of exchange rate pass-through in determining export performance in Bangladesh's RMG (Ready-Made Garments) sector. The study found a positive relationship between ERPT and export performance, where higher pass-through rates positively influenced export volumes and revenues. Currency devaluation acted as a mediator in this relationship, as devalued currency made RMG products more price competitive in international markets.

Choudhri and Hakura (2006) conducted a cross-country investigation including 71 nations to examine Taylor (2000)'s theory that the ERPT is considerably lower in low inflationary environments. They discover a significant incomplete pass-through, and they also discover that low inflation lowers ERPT since the latter represents the anticipated impact of monetary shocks on present and future costs. Similar findings are made by Akofio-Sowah (2009), who examines how the monetary system affects the scope of ERPT in nations in Sub-Saharan Africa and Latin America. Their findings, in contrast to those of other studies, indicate that the monetary policy regime had no appreciable influence on the ERPT since the recently established regimes did not raise the credibility of monetary policy. But they discover that the pass-through is lower for nations.
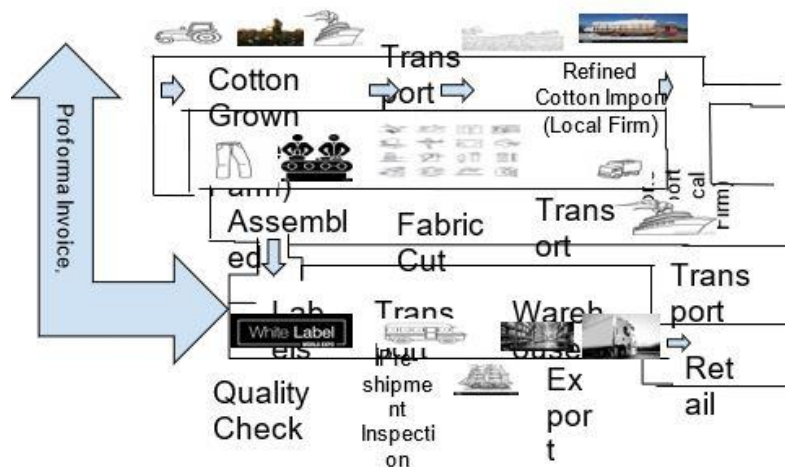

Fig.7 Typical Back-and-forth trade structure for apparel and textile products exchange rate pass through (International).
Source: Author's Compilation.

Razafimahefa (2012) conducts a cross-country analysis for Sub-Saharan African nations in order to understand the ERPT to local pricing and its causes. She finds that the pass-through is incomplete, asymmetric, and higher after domestic currency depreciations than after appreciations. Additionally, she discovers that from the middle of the 1990s, nations in Sub-Saharan Africa have seen a decrease in pass-through as a result of better macroeconomic and political conditions. He adds that nations with lower inflation rates, flexible currency rates, cautious monetary policies, and sustainable fiscal policies have lower ERPTs. According to a recent study by Kassi et al. (2019), ERPT has an unbalanced short-run effect. As a result, an exchange rate depreciation of 10% results in a 6% rise in prices, whereas an appreciation of 10% has no impact on prices at 5%.

(2016) Lariau et al. look at the extent of ERPT in Nigeria and Angola. The authors conclude that the long run ERPT for Angola is substantial but has recently been dropping owing to dedollarization, even if the short run ERPT is negligible due to price distortions brought on by administrative price fixing schemes. The ERPT is considered to be of little long-term significance for Nigeria. The fact that the majority of food is produced locally probably makes the short-run estimate important for nonfood pricing estimates. The ERPT in Egypt is analyzed by Helmy et al. (2018). They come to the conclusion that for the three price categories (consumer price index, producer price index, and import prices), the pass-through is high but gradual and incomplete. The makeup of Egypt's consumer basket, which is significantly impacted by commodities with subsidies and items with administered pricing, the authors claim, explains these results.

3. MODELING AND ANALYSIS

Import price indices (MPIs) track variations in the costs of products and services that citizens purchase from non-residents (the rest of the world). The MPIs are produced as a weighted average of the price indices for the elementary aggregates, using as weights the relative values of the trade for each elementary aggregate. The MPIs were collected from the International Monetary Fund. The Central Bank of Bangladesh's actual money supply (M3) aims to accurately reflect the state of the demand market. Most studies use the Gross Domestic Product (GDP) gap as a surrogate for the demand circumstances. The lack of monthly GDP data with a large money supply gap can be substituted to approximate the demand situation. By dividing the broad money supply by the CPI, the actual money supply is computed. The gap is calculated as the difference between the trend generated from the Bandpass filter and the actual real wide money supply. We may also utilize the gaps in the narrower money supply (M2 and M1) and the economic activity index to test the robustness of the model formulation.[2]

ERPT and asymmetric effects estimates throughout the long and short terms. Many research reports the estimated values of the baseline ERPT for different models. All of the domestic pricing' long-term elasticity to exchange rates and import prices exhibit anticipated sign. This shows that increased domestic costs as determined by the CPI are a result of both the weakening of the local currency and rising import prices.

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[2] *Source: IMF*

TABLE 1 Official Exchange Rate Bangladesh, India and Bhutan

Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan
1990	34.57	17.50	17.50	2001	55.81	47.19	47.19	2011	74.15	46.67	46.67
1991	36.60	22.74	22.74	2002	57.89	48.61	48.61	2012	81.86	53.44	53.44
1992	38.95	25.92	25.92	2003	58.15	46.58	46.58	2013	78.10	58.60	58.60
1993	39.57	30.49	30.49	2004	59.51	45.32	45.32	2014	77.64	61.03	61.03
1994	40.21	31.37	31.37	2005	64.33	44.10	44.10	2015	77.95	64.15	64.15
1995	40.28	32.43	32.43	2006	68.93	45.31	45.31	2016	78.47	67.20	67.20
1996	41.79	35.43	35.43	2007	68.87	41.35	41.35	2017	80.44	65.12	65.12
1997	43.89	36.31	36.31	2008	68.60	43.51	43.51	2018	83.47	68.39	68.39
1998	46.91	41.26	41.26	2009	69.04	48.41	48.41	2019	84.45	70.42	70.42
1999	49.09	43.06	43.06	2010	69.65	45.73	45.73	2020	84.87	74.10	74.10
2000	52.14	44.94	44.94								

Source: WB data

Exchange rate pass-through can also influence the trade balance and current account position. A paper by Hasan and Kabir (2019) found that a higher pass-through rate positively affects Bangladesh's trade balance. When exchange rate changes fully transmit to import prices, it leads to reduced import demand, improving the trade balance. A positive trade balance contributes to a stronger current account position, boosting overall export performance. The findings suggest that policymakers in Bangladesh should consider exchange rate pass-through while formulating export promotion strategies.

The central bank may intervene to minimize exchange rate volatility and cultivate a competitive exchange rate. Additionally, policies should prioritize export diversification to enhance resilience and reduce reliance on a narrow range of export products. The analysis demonstrates that exchange rate pass-through plays a crucial role in improving export performance in Bangladesh. A higher pass-through rate can enhance price competitiveness, stimulate the manufacturing sector, promote export diversification, and improve the trade balance. Policymakers should focus on implementing measures that facilitate exchange rate stability and foster export diversification, thus maximizing the benefits of exchange rate pass-through for Bangladesh's export performance.

Research on the ERPT in Mozambique has mostly concentrated on the exchange rate between the neighboring South African Rand (ZAR) and the Mozambican Metical (MZN). The investigations often reveal a pass-through between 10 and 74 percent. These varying results are mostly the consequence of varied modelling approaches, time periods, model specifications, and levels of aggregation of the domestic pricing variable. The exchange rate has a significant impact on a country's export performance, and understanding the mechanisms behind this relationship is vital for policy-makers and economists. Exchange rate pass-through (ERPT) refers to the degree to which changes in exchange rates affect the domestic prices of imported goods. This paper aims to analyse the relationship between exchange rate

pass-through and export performance in Bangladesh, with a focus on devaluation of the currency as a mediator factor.

Taylor (2000) examines ERPT and its change in the United States using a combination of macroeconomic and microeconomic models. His results suggest that the decline in pass-through is caused by a lower expectation of the durability of devaluation. Taylor assumes that firms set their prices based on estimates of future spending; thus, if they expect the depreciation of the national currency to persist, they are more likely to raise their prices.

TABLE 2 Commodity Import Price Index Bangladesh (BD), India (IN) and Bhutan (BT)

Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan
1990	50.75	33.76	55.08	2001	43.22	34.35	45.15	2011	115.11	106.92	112.68
1991	44.35	28.66	49.27	2002	46.60	35.73	45.97	2012	100.00	100.00	100.00
1992	43.43	28.58	48.89	2003	52.08	39.89	48.48	2013	98.48	99.80	102.36
1993	41.19	26.10	44.27	2004	57.05	48.87	58.77	2014	90.38	92.05	93.05
1994	44.67	25.68	45.92	2005	61.41	61.11	66.47	2015	65.02	57.07	70.16
1995	48.35	27.09	48.88	2006	71.70	72.31	75.98	2016	64.73	54.07	74.46
1996	49.12	29.45	49.05	2007	80.76	79.44	80.26	2017	72.20	64.79	84.50
1997	47.52	29.04	47.40	2008	98.99	99.54	107.47	2018	79.83	76.56	92.15
1998	40.02	22.47	41.59	2009	74.20	68.06	82.96	2019	71.78	68.32	82.83
1999	39.47	27.02	42.00	2010	91.49	86.81	99.08	2020	66.61	53.95	75.16
2000	46.19	37.06	47.13								

Commodity Export Price Index, Individual Commodites Weighted by Ratio of Exports to Total Commodity Exports /
Historical, Fixed Weights, Index

Data analysis appears to be rigorous and includes statistical models and econometric techniques. However, a more detailed explanation of the rationale for the variables and model specifications chosen would improve the analysis and increase transparency. In addition, the study could benefit from exploring the underlying mechanisms that drive exchange rate pass-through at different stages of the export value chain.

TABLE 3 Commodity Export Price Index Bangladesh (BD), India (IN) and Bhutan (BT)

Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan
1990	99.23	49.73	64.23	2001	102.82	46.17	49.08	2011	106.86	108.25	114.63
1991	91.02	44.79	58.34	2002	95.94	46.26	50.48	2012	100.00	100.00	100.00

1992	90.98	43.47	59.15	2003	100.84	50.05	53.29	2013	115.96	101.80	98.25
1993	95.20	41.87	60.46	2004	95.41	54.61	63.55	2014	127.53	96.80	95.23
1994	100.50	43.39	64.77	2005	93.91	63.11	68.94	2015	108.76	73.35	81.93
1995	101.16	44.33	67.16	2006	100.05	70.59	89.82	2016	109.23	72.94	85.89
1996	93.65	45.39	60.01	2007	96.81	73.36	94.90	2017	114.06	82.17	95.33
1997	105.67	48.21	59.18	2008	94.89	90.66	97.09	2018	104.55	84.18	95.72
1998	101.98	42.20	51.29	2009	77.65	77.15	78.39	2019	87.16	78.49	85.44
1999	94.53	42.76	49.62	2010	97.66	93.97	99.51	2020	79.16	73.26	85.82
2000	101.58	49.16	51.51								

Commodity Export Price Index, Individual Commodites Weighted by Ratio of Exports to Total Commodity Exports /

Historical, Fixed Weights, Index

According to (Taylor, 2000; Gagnon and Ihrig, 2004; McCarthy, 2007; zyurt, 2016), the weak and declining pass-through in developed and emerging countries is a result of the low inflation environment caused by more sophisticated, stable, and credible monetary policies that better anchor inflation expectations.

The ERPT is estimated by Gagnon and Ihrig (2004) for 20 industrialized countries. They find evidence that the ERPT was lower in stable countries with low inflation than in turbulent countries with high inflation. Moreover, they find that monetary policy has contributed to the declining ERPT, particularly as a result of central banks with inflation targets placing more emphasis on stabilizing inflation. They further argue that agents are less inclined to pass on cost increases, especially those resulting from currency depreciation, when the central bank is credible in fighting inflation and people understand its objectives.

TABLE 4 Trade Openness Bangladesh, India and Bhutan

Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan	Year	Bangladesh	India	Bhutan
1990	20.27	15.51	61.85	2001	36.88	25.99	74.03	2011	47.42	55.62	111.69
1991	18.97	16.99	76.09	2002	33.32	29.51	73.20	2012	48.11	55.79	101.76
1992	19.93	18.43	92.20	2003	34.25	30.59	76.36	2013	46.30	53.84	102.74
1993	23.12	19.65	79.11	2004	36.28	37.50	93.19	2014	44.51	48.92	98.31
1994	22.87	20.08	70.62	2005	39.63	42.00	102.70	2015	42.91	41.92	102.19
1995	28.21	22.87	82.73	2006	38.11	45.72	113.60	2016	37.95	40.08	85.41
1996	29.78	21.93	82.47	2007	39.95	45.69	112.27	2017	35.30	40.72	82.81
1997	30.01	22.62	82.69	2008	42.46	53.37	106.75	2018	38.24	43.40	86.71
1998	31.61	23.70	84.74	2009	40.09	46.27	106.91	2019	36.76	38.30	79.43

1999	31.85	24.82	83.77	2010	37.80	49.26	113.18				
2000	33.21	26.90	77.66								

Source: IMF data

We may consider Exchange rate Pass- Through (ERPT) as a function of the following important variables. An equation for regression may be developed accordingly.

$$Exchange\ Rate\ Pass - Through\ (ERPT) = f\ \{Exchange\ Rate, Trade\ Openness,$$
$$Inflation -$$
$$Consumer\ PriceIndex(CPI), Import\ Price\ Index\ (MPI), Export\ Price\ Index\ (EPI)$$

$$Exchange\ Rate\ Pass - Through\ (EPRT)$$
$$= \beta_0 + \beta_1 Exchange\ Rate + \beta_2\ (Trade\ Openness) +$$
$$\beta_3\ (Inflation - Consumer\ Price\ Index)$$
$$+ \beta_4\ (Import\ Price\ Index) + \beta_5 (Export\ Price\ Index\ ) + \varepsilon$$

Historical data on Exchange Rate Pass Through are not available on reliable data bases. Therefore, the regression directly of exchange rate can provide the respective results.

4. RESULTS AND DISCUSSION

A simple STATA software regression of exchange rate with trade openness (TO), inflation - consumer price index (CPI), import price index (MPI) and export price index (EPI) provides the following results (Table 5).

TABLE 5 Regression of exchange rate (ER) with trade openness (TO), inflation - consumer price index (CPI), import price index (MPI) and export price index (EPI) in Bangladesh.

reg ER TO CPI MPI EPI

```
     Source |    SS          df     MS       Number of obs   =      30
------------+----------------------------------   F(4, 25)      =    34.14
      Model | 2.02503688      4   .50625922    Prob > F       =   0.0000
   Residual | .370724931     25   .014828997   R-squared      =   0.8453
------------+----------------------------------   Adj R-squared =   0.8205
      Total | 2.39576181     29   .082612476   Root MSE       =   .12177


--------------------------------------------------------------------------
         ER | Coefficient  Std. err.     t    P>|t|   [95% conf. interval]
------------+-------------------------------------------------------------
         TO |  .7247706    .1392012    5.21   0.000    .4380804   1.011461
        CPI | -.0623128    .0626257   -1.00   0.329   -.1912928   .0666672
        MPI |  .3201914    .1225196    2.61   0.015    .0678576   .5725253
```

```
     EPI |  .022792   .2590029    0.09   0.931   -.5106344   .5562184
    _cons | .2016458   1.135193    0.18   0.860   -2.136329   2.53962
-----------------------------------------------------------------------------
```

Source: Author's calculation using log value of variables from WB and IMF data

Based on consumer price indices, there is considerable variation in exchange rate penetration within the export value chain in Bangladesh. Exchange rate pass-through to consumer prices in Bangladesh is moderate. There exists a relatively high pass-through of exchange rate fluctuations to production costs within the export value chain in Bangladesh. This means that exchange rate changes tend to affect the cost of factors of production, including labour, energy, and raw materials, which in turn can affect the competitiveness of exported goods. ERPT studies have shown that exchange rate changes have limited impact on final export prices. There are numerous variations of ERPT at different stages of the export value chain. Policy makers and exporters can use these findings to develop strategies to mitigate the effects of exchange rate fluctuations, maintain competitiveness, and ensure the stability of the export sector. Fig.8 depicts the trend of consumer price index of Bangladesh, India and Bhutan.
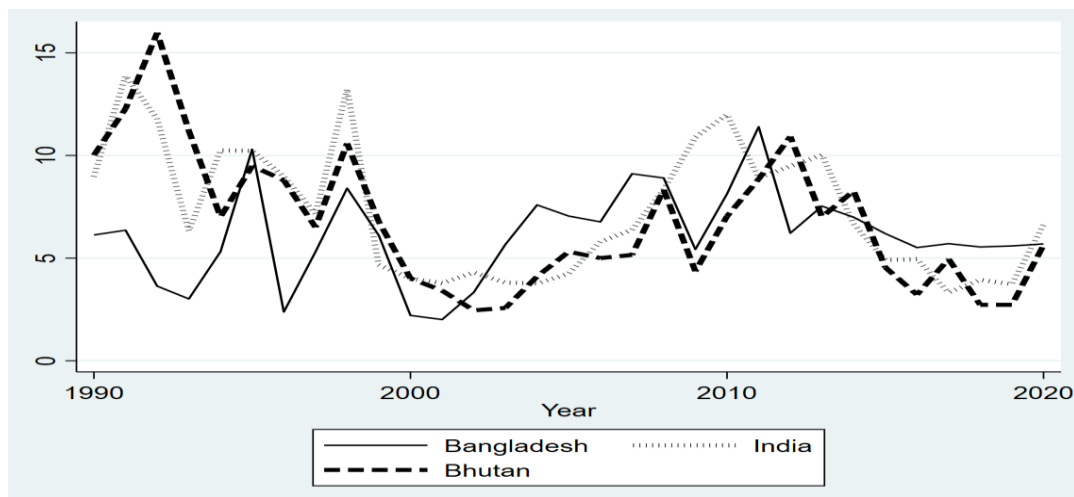

Fig.8 Consumer Price Index (Source:WB Data)

ERPT indicated a relatively high pass-through of exchange rate fluctuations to the import prices of raw materials. This implies that changes in exchange rates tend to affect the cost of imported inputs in the export value chain, which subsequently impacts the export prices. The pass-through of exchange rate changes to the production costs of exported goods was relatively moderate. This suggests that exchange rate fluctuations have a moderate impact on the overall production costs of exported products in Bangladesh. A low pass-through of exchange rate changes to the final export prices. This implies that exporters in Bangladesh tend to absorb a significant portion of the exchange rate fluctuations, potentially in order to maintain competitiveness in international markets. ERPT within the export value chain across Bangladesh, India, and Bhutan highlighted variations in the degree of pass-through among the countries. While Bangladesh exhibited a moderate-to-high pass-through at the sourcing stage, India and Bhutan demonstrated a lower pass-through. This suggests that exchange rate fluctuations in Bangladesh have a relatively greater impact on the cost of imported inputs.

ERPT is a measure of the extent to which changes in exchange rates affect the prices of imported goods and, subsequently, export prices. Understanding ERPT is critical to assessing the competitiveness of products in international markets. Import price indices from Bangladesh, India, and Bhutan for the period 1990 to 2020 were used for the study. The study conducted a time series analysis to examine the relationship between exchange rate changes and subsequent changes in export prices. Various econometric techniques were used to estimate the ERPT coefficients. The results of the study showed significant variations in ERPT at different stages of the export value chain in Bangladesh. The following results were obtained with respect to ERPT in the export value chain:
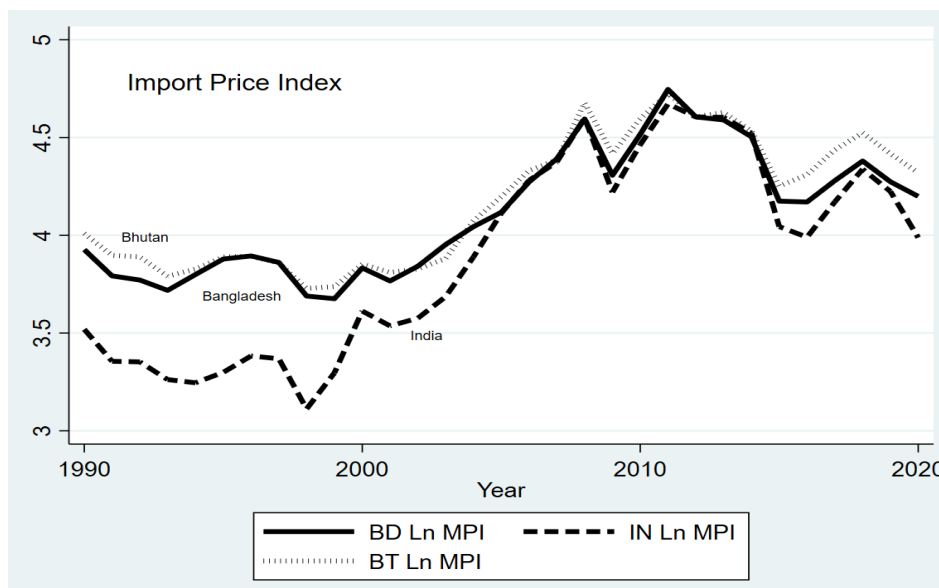
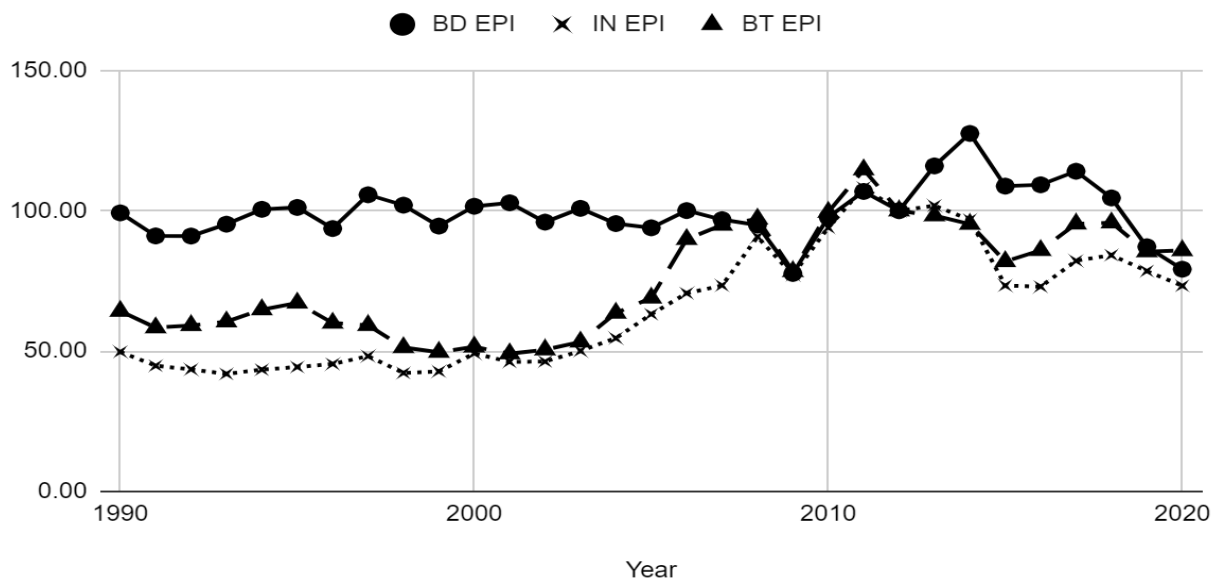***Fig.9 Import Price Index Bangladesh - India - Bhutan***
(Source: Author's calculation from IMF data)

The export value chain is a critical component of a country's international trade, and understanding the relationship between exchange rates and export prices is crucial for policy decisions and economic forecasting. This study examines the exchange rate pass-through in the export value chain of Bangladesh, focusing on the relationship between the export price index of Bangladesh, India, and Bhutan. The collected secondary data on export price indices from the respective central banks or relevant statistical offices of Bangladesh, India and Bhutan show that there is a dynamic relationship between the variables. Many studies estimate the long-term impact of exchange rate fluctuations on export prices.

The results of this research have several implications for policy-makers, exporters, and stakeholders in Bangladesh's export sector. Understanding the variations in ERPT across different stages of the export value chain helps policy-makers formulate effective strategies to mitigate the effects of exchange rate fluctuations on export competitiveness. For exporters, recognizing the limited pass-through at the final export stage allows them to make informed pricing decisions. Furthermore, exporters in Bangladesh may need to enhance their hedging mechanisms, to manage the risks associated with exchange rate fluctuations. Additionally, policy-makers could focus on stabilizing domestic exchange rates and improving the overall business environment for exporters. There are unclear variations in ERPT at different stages of the export value chain. Understanding these dynamics is crucial for policy-makers and exporters to effectively

manage exchange rate risks and maintain competitiveness in international markets. Further research in this area could explore the determinants of ERPT and the effectiveness of policy measures in mitigating exchange rate risks. Fig.10 shows the export price index of Bangladesh, India and Bhutan.

Fig.10 Export Price Index of Bangladesh, India and Bhutan (Source: IMF data)

Several researchers found that the estimated coefficient on exchange rate pass-through for Bangladesh, India, and Bhutan indicated different degrees of exchange rate transmission to export prices. In the case of Bangladesh, the coefficient indicated a moderate to high pass-through effect, implying that exchange rate changes significantly affected export prices. On the other hand, both India and Bhutan had relatively low exchange rate pass-through coefficients, indicating a weaker relationship between exchange rates and export prices.

Similarly, the study found that a devaluation of the local currency in Bangladesh would lead to an increase in export prices. This suggests that Bangladeshi exporters may have limited ability to absorb exchange rate fluctuations, leading to higher costs for exported goods. In contrast, export prices in India and Bhutan were less sensitive to exchange rate fluctuations. Many results suggest that a large exchange rate pass-through in Bangladesh could affect the country's competitiveness in the international market. Significant pass-through of exchange rate fluctuations to export prices could make Bangladeshi goods relatively more expensive relative to competitors, leading to a potential decline in export volumes.

The findings of this study have significant implications for policymakers in Bangladesh. The higher exchange rate pass-through coefficient suggests the need for the government and central bank to closely monitor exchange rate movements and their impact on export prices. Measures such as exchange rate stabilization policies, export subsidies, or hedging mechanisms could be explored to mitigate the adverse effects of exchange rate fluctuations on export competitiveness. Comparatively lower exchange rate pass-

through coefficients in India and Bhutan indicate a relatively smaller impact of exchange rate changes on export prices. However, this does not imply complete immunity or the absence of any exchange rate effects. The governments of India and Bhutan should still consider the potential consequences of exchange rate dynamics and their impact on trade competitiveness.

For most of the studies, it is important to note that the results obtained in this study are based on the limited sample period and the specific context of Bangladesh, India, and Bhutan. Further research expansion could include other countries in the region or a longer time frame to provide a comprehensive understanding of the exchange rate pass-through in the export value chain and focus on the determinants of ERPT and evaluating the effectiveness of policy measures in managing exchange rate risks.

Regression with and without trade openness provides differences in coefficient significantly. Historical data on exchange rate pass - through are not available. An indirect measure of responsiveness on changes of exchange rate may provide the direction with magnitude of relationship. However, regression of exchange rate with inflation - consumer price index (CPI), import price index (MPI) and export price index (EPI) provides the following results:

TABLE 6 Regression of exchange rate (ER) with inflation - consumer price index (CPI), import price index (MPI) and export price index (EPI) in Bangladesh.

reg ER CPI MPI EPI

Source	SS	df	MS		Number of obs	=	31
					F(3, 27)	=	16.88
Model	1.65070923	3	.550236411		Prob > F	=	0.0000
Residual	.879866822	27	.03258766		R-squared	=	0.6523
					Adj R-squared	=	0.6137
Total	2.53057605	30	.084352535		Root MSE	=	.18052

ER	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]	
CPI	-.1222027	.0913889	-1.34	0.192	-.3097173	.0653119
MPI	.8128573	.1246285	6.52	0.000	.5571407	1.068574
EPI	-.0218271	.3388479	-0.06	0.949	-.7170856	.6734315
_cons	1.047015	1.528639	0.68	0.499	-2.089494	4.183523

Source: Author's calculation using log value of variables from WB and IMF data

5. CONCLUSION

In open economies, the currency rate plays a significant role in determining domestic pricing. Bangladesh is hardly an exception, as imports account for a sizable portion of consumption. Many studies evaluated the exchange rate pass-through, or the degree to which changes in the currency rate are reflected in domestic pricing. The nominal exchange rate —the US dollar (USD/Taka) shows considerable pass-through effects. The pass-through accounting for the inflation environment, the global financial crisis of 2007–2009, asymmetric pricing impacts, and the change in monetary policy are all examined by many researchers. In keeping with Taylor's 2000 theory and the majority of empirical investigations, researchers find considerable and increased pass-through during the high-volatility inflationary phase. Regarding the global financial crisis of 2007–2009, researches discover that it caused a brief rise in the pass-through coefficient before it returned to its long-term trend. Additionally, they discover evidence of asymmetric effects in the short-term pass-through, which suggests that depreciations are communicated to domestic prices more strongly than appreciations.

Many investigation results have implications for macroeconomic strategy. The rapid rate of adjustment and overall large size of the ERPT provide a substantial policy problem that is challenging to address in the near future. Targeting the level of the exchange rate or its volatility in an effort to contain the ERPT to inflation might be a dangerous move that is unachievable given the existing level of foreign reserves. This is especially true when financial restraint is not necessary. Instead, a system with a floating exchange rate that is compatible with a credible interest rate-based, forward-looking monetary policy regime may succeed in stabilizing inflation expectations. In this regard, Bangladesh's recent switch to a monetary policy system based on interest rates has the potential to gradually lower the ERPT. Further issues about the ERPT's dynamics might benefit from clarity as Bangladesh's transition to the new monetary policy regime go forward: What (if anything) explains why the ERPT is greater during times of significant macroeconomic volatility? (ii) In times of extreme macroeconomic volatility, does the asymmetric ERPT seen in the short term still hold true? Will the predicted decrease in ERPT be the result of the new monetary policy regime? It is necessary to do more study to provide answers to these queries.

REFERENCES

1. Ahmed, F., Rahman, M. A., & Jahan, S. (2018). Exchange rate pass-through and export performance in Bangladesh: A Toda-Yamamoto causality approach. International Journal of Economics and Financial Issues, 8(1), 105-112.
2. Aisen, A., & Simione, F. (2019). Towards a New Monetary Policy in Mozambique. *Journal of Applied Business and Economics*, 21 (6), 12–24.

3. Akofio-Sowah, N. (2009). Is There a Link Between Exchange Rate Pass-Through and the Monetary Regime: Evidence from Sub-Saharan Africa and Latin America. *International Advances in Economic Research*, 15, 296–309.

4. Amiti, M., Itskhoki, O., and Konings, J. (2014). Importers, exporters, and exchange rate disconnect. American Economic Review, 104(7):1942–1978.

5. Armington, P. (1969). A theory of demand for products distinguished by place of production. IMF Staff Papers, 16:159–176.

6. Arndt, S. W. (2008). Cross-border production sharing and exchange rates in east asia. SSRN Working Paper Series.

7. Arndt, S. W. and Kierzkowski, H. (2001). Fragmentation: New production patterns in the world economy. OUP Oxford.

8. Arndt, S. W. et al. (2014). Evolving patterns in global trade and finance. World Scientific Books.

9. Bache, I. (2006). Econometrics of exchange rate pass-through. *Norges Bank Doctoral Dissertations in Economics No 6*.

10. Baldwin, R. and Venables, A. J. (2013). Spiders and snakes: offshoring and agglomeration in the global economy. Journal of International Economics, 90(2):245–254.

11. Ba'nk, L., COrhonen, I. H., & El-Shagi, M. (2017). Exchange rate pass-through in European emerging economies: Changes in the wake of the Global Financial Crisis. Economic Systems, 41(4), 537-549.

12. Bayoumi, T. A., Lee, J., and Jayanthi, S. (2006). New rates from new weights. IMF Staff Papers, 53(2).

13. Bayoumi, T., Saito, M., and Turunen, J. (2013). Measuring competitiveness: Trade in goods or tasks? IMF Working Paper, May 2013(WP/13/100).

14. Bems, R. (2014). Intermediate inputs, external rebalancing and relative price adjustment. Journal of International Economics.

15. Bems, R. and Johnson, R. C. (2015). Demand for value added and value-added exchange rates. NBER Working Paper, (w21070).

16. Brun-Aguerre, R., Fuertes, A.-M., and Phylaktis, K. (2012). Exchange rate pass-through into import prices revisited: what drives it? Journal of International Money and Finance, 31(4):818–844.

17. Burstein, A. and Gopinath, G. (2014). International prices and exchange rates. Handbook of International Economics,, 4:391–451.

18. Burstein, A., & Gopinath, G. (2014). International Prices and Exchange Rates International Economics. *Handbook of* (4), 391–451.

19. Campa, J. M. and Goldberg, L. S. (2005). Exchange rate pass-through into import prices. Review of Economics and Statistics, 87(4):679–690.

20. Campa, J. M. and Mínguez, J. M. G. (2006). Differences in exchange rate pass-through in the euro area. European Economic Review, 50(1):121–145.

21. Capistrán, C., & Ramos-Francia, M. (2010). Exchange rate pass-through effects in Mexico: Evidence from local currency bond markets. Journal of International Money and Finance, 29(3), 555-578.

22. Chengwei Liu, Yixiang Chan, Syed Hasnain Alam Kazmi, Hao Fu, "Financial Fraud Detection Model: Based on Random Forest," International Journal of Economics and Finance, Vol. 7, Issue. 7, pp. 178-188, 2015.

23. Cheung, Y.-W., Chinn, M. D., and Qian, X. (2012). Are chinese trade flows different? Journal of International Money and Finance, 31(8):2127–2146.

24. Choudhri, E., & Hakura, D. (2006). Exchange Rate Pass-through to Domestic Prices: Does the Inflationary Environment Matter? *Journal of International Money and Finance*, 614–639.

25. Chowdhury, K. A., & Schnabl, G. (2015). Exchange rate dynamics and monetary spillovers with imperfect financial markets: A nonlinear analysis. Journal of Macroeconomics, 46, 155-170.

26. Chungy, W. (2012). Back-and-forth trade and endogenous exchange rate pass-through. Daudin, G., Rifflart, C., and Schweisguth, D. (2011). Who produces for whom in the world economy? Canadian Journal of Economics/Revue canadienne d'économique, 44(4):1403–1437.

27. Cirera, X., & Nhate, V. (2006). Price, An Empirical Estimation of the Degree ofTransmission from Border to Consumer Prices in Mozambique. *Ministry of Planning and Development Discussion Paper No 39*.

28. De Benedictis, L., Nenci, S., Santoni, G., Tajoli, L., and Vicarelli, C. (2014). Network analysis of world trade using the baci-cepii dataset. Global Economy Journal, 14(3-4):287–343.

29. Frankel, J., Parsley, D., & Wei, S. (2005). Slow Passthrough Around the World: A New Import For Developing Countries? *NBER Workin Paper 11199*.

30. Gagnon, J., & Ihrig, J. (2004). Monetary Policy and Exchange Rate Pass-Through. *International Journal of Finance and Economics*, 9 (4), 315–338.

31. Ganesh Kumar and P.Vasanth Sena, "Novel Artificial Neural Networks and Logistic Approach for Detecting Credit Card Deceit," International Journal of Computer Science and Network Security, Vol. 15, issue 9, Sep. 2015, pp. 222-234

32. Gaulier, G., Lahrèche-Révil, A., and Méjean, I. (2008). Exchange-rate pass-through at the product level. Canadian Journal of Economics/Revue canadienne d'économique, 41(2):425–449.

33. Ghosh, A. (2009). Implications of production sharing on exchange rate pass-through. International Journal of Finance & Economics, 14(4):334–345.

34. Ghosh, A. (2013). Cross-border production sharing and exchange-rate sensitivity of mexico's trade balance. The Journal of International Trade & Economic Development, 22(2):281–297.

35. Gyusoo Kim and Seulgi Lee, "2014 Payment Research", Bank of Korea, Vol. 2015, No. 1, Jan. 2015.

36. Halicioglu, F., & Ketenci, N. (2017). Changing dynamics of exchange rate pass-through in India: Evidence from an LSTAR model. International Journal of Finance & Economics, 22(2), 154-166.

37. Haque, M. A., Hossain, M. K., & Azam, M. (2019). Exchange rate pass-through and export performance in the RMG sector of Bangladesh. Bangladesh Development Studies, 42(1), 89-104.

38. Hassan, S. & Simione, F. (2013). Exchange Rate Determination Under Monetary Policy Rules in a Financially Underdeveloped Economy: A Simple Model and Application to Mozambique. *Journal of International Development*. Vol. 25, Issue 4, pp. 502–519.

39. Helmy, O., Fayed, M., & Hussien, K. (2018). Exchange rate pass-through to inflation in Egypt: a structural VAR approach. *Review of Economics and Political Science*, 3 (2), 2–19.

40. Hitesh D. Bambhava, Prof. Jayeshkumar Pitroda, Prof. Jaydev J. Bhavsar (2013), "A Comparative Study on Bamboo Scaffolding And Metal Scaffolding in Construction Industry Using Statistical Methods", International Journal of Engineering Trends and Technology (IJETT) – Volume 4, Issue 6, June 2013, Pg.2330-2337.

41. Hummels, D., Ishii, J., and Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. Journal of international Economics, 54(1):75–96.

42. Jašová, M., Moessner, R., & Takáts, E. (2016). Exchange rate passthrough: What has changed since the crisis? *BIS Working Paper No 583*.

43. Johnson, R. C. (2014). Five facts about value-added exports and implications for macroeconomics and trade research. The Journal of Economic Perspectives, 28(2):119–142.

44. Johnson, R. C. and Noguera, G. (2012). Accounting for intermediates: Production sharing and trade in value added. Journal of International Economics, 86(2):224–236.

45. Kandil, M., Mirzaie, I., & Zhang, S. (2017). Exchange rate pass-through in the GCC: The role of oil prices, inflation, and non-linearities. Journal of International Financial Markets, Institutions & Money, 46, 158-173.p

46. Kassi, D., Rathnayake, D., Edjoukou, A., Gnangoin, Y., Louembe, P., Ding, N., & Sun, G. (2019). Asymmetry in Exchange Rate Pass-Through to Consumer Prices: New Perspective from Sub-Saharan African Countries. *Economies*, 7 (5), 1–33.

47. Khan, M. R., & Qayyum, A. (2019). Exchange rate pass-through and inflation dynamics in a developing economy: Evidence from Pakistan. The Journal of Developing Areas, 53(1), 267-279.

48. Koopman, R., Wang, Z., and Wei, S.-J. (2012). Estimating domestic content in exports when processing trade is pervasive. Journal of Development Economics, 99(1):178–189.

49. Koopman, R., Wang, Z., and Wei, S.-J. (2014). Tracing value-added and double counting in gross exports. American Economic Review, 104(2):459–494.

50. Krugman, P. (1987). Pricing to Market when the Exchange Rate Changes. in Sven Arndt and J. David Richardson, eds., *Real Financial Linkages Among Open Economies*, MIT Press: Cambridge, pp. 49–70.

51. Lariau, A., El Said, M., & Takebe, M. (2016). An Assessment of the Exchange Rate Pass-Through in Angola and Nigeria. *IMF Working Paper No 16/191*.

52. Leigh, D., Lian, W., Poplawski-Ribeiro, M., Szymanski, R., Tsyrennikov, V., & Yang, H. (2016). Exchange Rates and Trade: A Disconnect? *IMF Working Paper*.

53. Llaudes, R. (2012). Exchange rate pass-through to import prices in the Euro area: A multicountry econometric analysis. Journal of International Money and Finance, 31(6), 758-775.

54. Lopez-Villavicencio, A., & Mignon, V. (2016). Exchange Rate Pass-through in Emerging Countries: Do the Inflation Environment, Monetary Policy Regime and Institutional Quality Matter? *CEPII Working Paper No. 2016–07*.

55. Mahadevan, R. (2010). Exchange rate pass-through into domestic prices: Evidence from South Africa. Economic Modelling, 27(5), 891-897.

56. Marazzi, M., Sheets, N., Vigfusson, R., Faust, J., Gagnon, J., Marquez, J., Martin, R., Reeve, T., Rogers, J., et al. (2005). Exchange rate pass-through to us import prices: some new evidence. Board of Governors of the Federal Reserve System, International Finance, (DP 833).

57. McCarthy, J. (2007). Pass-through of Exchange Rates and Import Prices to Domestic Inflation in Some Industrialized Economies. *Eastern Economic Journal*, 33 (4), 511–537.

58. Mishkin, F. (2008). Exchange Rate Pass-Through and Monetary Policy. *NBER Working Paper 13889*.

59. Mohabbat, R., & Chowdhury, A. (2019). Exchange rate pass-through in Bangladesh: Analysis of the manufacturing sector. The Journal of Developing Areas, 53(2), 161-179.

60. Narayan, P. (2005). The saving and investment nexus in China: evidence from cointegration tests. *Applied Economics*, 37, 1979 – 1990.

61. Nkoro, E., & Uko, A. (2016). Autoregressive Distributed Lag cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods*, 5 (4), 63–91.

62. Obstfeld, M. & Rogoff, K. (1995). Exchange Rate Dynamics Redux. *Journal of Political Economy*, Vol. 103, pp. 624–660.

63. Omar, J. (2003). Modelação da Inflação em Moçambique: Uma Contribuição. *Staff Paper Nº 18*.

64. Özyurt, S. (2016). Has the exchange rate pass through recently declined in the euro area? *ECB Working Paper No 1955*.

65. P. Ganesh Prabhu, D. Ambika, "Study on Behaviour of Workers in Construction Industry to Improve Production Efficiency", International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development (IJCSEIERD), Vol. 3, Issue 1, Mar 2013, 59-66

66. Patel, N., Wang, Z., and Wei, S.-J. (2014). Global value chains and effective exchange rates at the country-sector level. Working Paper 20236, National Bureau of Economic Research.

67. Pesaran, M., Shin, Y., & Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 17, 289–326.

68. Powers, W. and Riker, D. (2013). Exchange rate pass-through in global value chains: The effects of upstream suppliers. Working Paper 2013-02B.

69. Powers, W. and Riker, D. (2015). The effect of exchange rates on the costs of exporters when inputs are denominated in foreign currencies. The International Trade Journal, 29(1):3–18.

70. Purfield, C. and Rosenberg, C. B. (2010). Adjustment under a currency peg: Estonia, latvia and lithuania during the global financial crisis 2008-09. IMF Working Papers, pages 1–34.

71. Rahman, M. R., & Mustafa, I. S. (2020). Exchange rate pass-through and export performance in the textile sector of Bangladesh. Asian Journal of Economic Modelling, 8(2), 147-162.

72. Rahman, M. R., Hossain, M. M., & Islam, M. R. (2017). Exchange rate pass-through and export performance in Bangladesh: Empirical evidence. Journal of Applied Economics and Business Research, 7(3), 182-204.

73. Razafimahefa, I. (2012). Exchange Rate Pass-Through in Sub-Saharan African Economies and its Determinants. *IMF Working Papers 12/141*.

74. Rodríguez-López, J. A. (2011). Prices and exchange rates: A theory of disconnect. The Review of Economic Studies, pages 1135–1177.

75. Saito, M., Ruta, M., and Turunen, J. (2013). Trade interconnectedness: The world with global value chain. Policy paper, IMF Policy Paper.

76. Shin, Y., Yu, B., Greenwood-Nimmo, & M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. In W. Horrace, & R. Sickles, *Econometric Methods and Applications* (pp. 281–314). New York : Springer.

77. Taylor, A. & Taylor, M. (2004), " The Purchasing Power Debate", *Journal of Economic Perspectives*, 18:1, 135–158

78. Taylor, J. (2000). Low Inflation, Pass-Through, and Pricing Power of Firms. *European Economic Review*, 44 (7), 1389–408.

79. Thorbecke, W. and Smith, G. (2010). How would an appreciation of the renminbi and other east asian currencies affect china's exports? Review of International Economics, 18(1):95–108.

80. Timmer, M. P., Dietzenbacher, H., Los, B., and Robert Stehrer, G. J. (2014a). The World Input-Output Database: Content, Concepts and Applications.

81. Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R., and de Vries, G. J. (2014b). Slicing up global value chains. The Journal of Economic Perspectives, 28(2):99–118.

82. Tunç, C. (2017). A Survey on Exchange Rate Pass through in Emerging Markets. *Bulletin of Economic Theory and Analysis*, 2 (3), 205–233.

83. Ubide, A. (1997). Determinants of Inflation in Mozambique. *IMF Working Paper No. 97/145*, International Monetary Fund, Washington.

84. Uddin, M. G. S., & Siddiqui, T. (2018). Determinants of exchange rate pass-through in Bangladesh: An empirical investigation. Business Economics Journal, 9(3), 1-11.

85. Vicente, C. (2007). Exchange rate and consumer prices in Mozambique: a cointegration approach. In L. de Brito, C. Castel-Branco, S. Chichava, & A. Francisco, *Reflecting about Economic Questions* (pp. 178–194). Maputo: IESE.

86. Wang, Z., Wei, S.-J., and Zhu, K. (2013). Quantifying international production sharing at the bilateral and sector levels. Working Paper 19677, National Bureau of Economic Research.