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WHO HAS BENEFITTED FROM MALAYSIA-PAKISTAN FREE TRADE AGREEMENT? AN INDUSTRY LEVEL ANALYSIS

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A Free Trade Agreement between Malaysia and Pakistan, formally known as Closer Economic Partnership Agreement (MPCEPA) took place in 2007. We analyze the trade flows of 31 industries that trade between the two countries in order to identify industries that benefit from the agreement in Pakistan and those that benefit in Malaysia. Combining the results from estimating the linear and nonlinear trade balance models for each industry, we find significant evidence of relatively more industries benefitting from the agreement in Pakistan.

Keywords: Free Trade Agreement, Malaysia, Pakistan, 31 Industries
JEL Classification: F14, F31

1. INTRODUCTION

Among many trade agreements with other nations, Malaysia has signed its first Free Trade Agreement (FTA) in South Asian region with Pakistan in 2007; formally known as Malaysia-Pakistan Closer Economic Partnership Agreement (MPCEPA)[1]. After this agreement Malaysia has become one of the top trading partners of Pakistan, relishing a positive trade balance with Pakistan over the years (Amir and Anum, 2015; Mehmood and Gul, 2014)[2]. Such agreements come after long negotiations that attempt to safeguard the participating countries interests (e.g. reciprocity in trade concessions). Perroni and Whalley (2000) among others, note that in regional trade agreements more concessions are made by the smaller acceding country making the agreement more one sided favorable. They call it insurance arrangement which is the premia by the smaller country

[1] Malaysia-Pakistan is an emerging markets trade pair.
[2] Khan et al. (2018) also notes a potential win-win scenario for both countries after the FTA.

to secure large market access. The question we ask in this paper is: who has benefitted from the FTA agreement between Pakistan and Malaysia? Since different trading industries have different comparative advantage, some industries could benefit in one country and some in other country.

To identify industries that could benefit from the FTA, it is easy to look at the trend in their trade flows. However, this approach could be misleading since other important and relevant factors determining trade are left out. Thus, the approach must account for other important determinants of the trade flows in addition to a factor accounting for the FTA. The other factors that are said to be relevant in the literature include level of economic activity in both countries and a measure of relative prices, i.e., the real ringgit-rupee exchange rate. Fortunately, a model that includes these important determinants of the trade is known as the trade balance model which has received a great deal of attention in the literature. Specifically, since the exchange rate is included in the model, deterioration of the U.S. trade balance in 1971 despite a 15% depreciation of the dollar moved the literature in a new direction of testing the J-curve phenomenon which basically claims that due to adjustment lags, a depreciation worsens the trade balance in the short run but could improve it in the long run.[3] The literature that has been reviewed by Bahmani-Oskooee and Ratha (2004) and Bahmani-Oskooee and Hegerty (2010) reveal that error-correction modeling is used to test the short-run effects and cointegration is used to test the long-run effects.

Today, the literature has moved into a new direction by showing that lack of any relation between the trade balance and the real exchange rate could be due to assuming the link to be linear or symmetric. However, recently Bahmani-Oskooee and Fariditavana (2015, 2016) argued for the inappropriateness of linear assumption in J-curve analysis. In fact, the effects of exchange rate changes are asymmetric such that exchange rate fall and rise lead to different proportional changes in the trade balance. Aligning with recent line of research, we examine the impact of the 2007 FTA on Malaysian bilateral trade with Pakistan focusing on 31 industries over monthly time frequency using both the linear and nonlinear trade balance models. To that end, we outline the models and methods in Section 2. We then present our empirical findings in Section 3 that is followed by a summary in Section 4. Finally, we define the variables and provide source of the data in the Appendix.

2. THE MODELS AND METHODS

In formulating the trade balance model, we begin with a model that was derived by Rose and Yellen (1987). However, we modify their specification so that our specification conforms to commodity level data as outlined by Equation (1):

[3] Magee (1973) was the first to introduce the concept and Bahmani-Oskooee (1985), the first to introduce a method of testing the phenomenon.

$$\ln\left(\frac{M_{i,t}}{X_{i,t}}\right) = \alpha_o + \alpha_1 FC_{2008} + \alpha_2 TL_{MPCEPA} + \alpha_3 LnIP_t^{ML} + \alpha_4 LnIP_t^{PK} + \alpha_5 LnREX_t + \varepsilon_t, \quad (1)$$

where $\frac{M_{i,t}}{X_{i,t}}$ is a measure of the trade balance of industry *i*. For reasons to follow, we define the trade balance as the ratio of Malaysian imports (M_i) of industry i from Pakistan over her exports of the same industry to Pakistan. Since data are monthly, the only measures of economic activity at monthly frequency are the Industrial Production Index of Malaysia, IP_t^{ML} and Pakistan IP_t^{PK}. The real bilateral exchange rate is denoted by REX_t and is defined in a manner that a decline reflects a real depreciation of Malaysian ringgit against Pakistani rupee (Appendix). We include two dummies FC_{2008} and TL_{MPCEPA} to account for the possible effects of global financial crisis (GFC) of 2008 and MPCEPA free trade agreement.

While detailed definitions of variables are provided in the Appendix, the regression estimate of α_1 is expected to be negative or positive, depending upon the degree with which it hurts imports and exports. If Malaysian imports (Pakistani exports) are hurt by more than her exports, then an estimate of α_1 is expected to be negative. Otherwise, it could be positive. Similarly, an estimate of α_2 is expected to be negative if the free trade agreement benefits Malaysia by boosting her exports more than boosting Pakistan's exports (which is Malaysian imports). Thus, a positive estimate of α_2 will benefit Pakistan. As for the effects of economic activities, since an increase in economic activity in Malaysia stimulates her imports, an estimate of α_3 is expected to be positive. By the same token an estimate of α_4 is expected to be negative if increased economic activity in Pakistan boosts Malaysian exports.[4]

As mentioned, theoretical and empirical research suggest that the short run effects of exchange rate changes on trade balance could be different than its long run effects. Thus, it is important that in estimating the long-run effects as outlined by (1) we incorporate the short-run dynamics by turning (1) into an error-correction model as in (2) below:

$$\Delta\ln\frac{M_{i,t}}{X_{i,t}} = \beta_o + \beta_1 FC_{2008} + \beta_2 TL_{MPCEPA} + \sum_{j=1}^{n1}\beta_{3,j}\Delta\ln\frac{M_{i,t-j}}{X_{i,t-j}} + \sum_{j=0}^{n2}\beta_{4,j}\Delta\ln IP_{t-j}^{ML} + \sum_{j=0}^{n3}\beta_{5,j}\Delta\ln IP_{t-j}^{PK} + \sum_{j=0}^{n4}\beta_{6,j}\Delta\ln REX_{t-j} + \gamma_o\ln\frac{M_{i,t-1}}{X_{i,t-1}} + \gamma_1\ln IP_{t-1}^{ML} + \gamma_2\ln IP_{t-1}^{PK} + \gamma_3\ln REX_{t-1} + \varepsilon_t. \quad (2)$$

[4] Bahmani-Oskooee (1986) points out that if production of import substitutes is fueling the economic activity, then the expected signs of α_3 and α_4 can be negative and positive, respectively.

Specification (2) is due to Pesaran et al. (2001) and has a unique advantage of estimating the short-run and the long-run effects of exogenous variables on the trade balance in one step. More precisely, coefficients ($\beta_4 - \beta_6$) attached to first differenced variables accomplish the short-run effects while the coefficients ($\gamma_1 - \gamma_3$) normalized on (γ_o) gather the long run effects. However, to validate the long-run estimates, Pesaran et al. (2001) suggest an F test to establish joint significance of lagged level variables as a sign of cointegration. They provide new critical values that consider the integrating properties of the variables. Indeed, variables could be a combination of I(1) and I(0) which are the integrating properties of most macro variables and this is another advantage of this approach.

Recent studies report that exchange rate effects on trade are asymmetric due to the traders' different expectations to currency appreciation compared to currency depreciation. Since testing for asymmetric effects requires using nonlinear models, the results from linear models such as (2) may be inappropriate or invalid. To expose the possible exchange rate asymmetries, we follow Shin et al. (2014) and construct a real exchange rate changes ($\Delta \ln REX_t$) series which includes positive as well as negative changes. From it we segregate the changes into two series: one series containing only positive changes (POS_t) and other series containing only negative changes (NEG_t) using the partial sum concept[5]. We then replace $\ln REX$ in (1) and (2) by the two partial sum variables to arrive at:

$$\Delta\ln\frac{M_{i,t}}{X_{i,t}} = \beta_o + \beta_1 FC_{2008} + \beta_2 TL_{MPCEPA} + \sum_{j=1}^{n1}\beta_{3,j}\Delta\ln\frac{M_{i,t-j}}{X_{i,t-j}} + \sum_{j=0}^{n2}\beta_{4,j}\Delta\ln IP_{t-j}^{ML} + \sum_{j=0}^{n3}\beta_{5,j}\Delta\ln IP_{t-j}^{PK} + \sum_{j=0}^{n4}\beta_{6,j}\Delta POS_{t-j} + \sum_{j=0}^{n5}\beta_{7,j}\Delta NEG_{t-j} + \gamma_o\ln\frac{M_{i,t-1}}{X_{i,t-1}} + \gamma_1\ln IP_{t-1}^{ML} + \gamma_2\ln IP_{t-1}^{PK} + \gamma_3 POS_{t-1} + \gamma_4 NEG_{t-1} + \varepsilon_t. \quad (3)$$

After the introduction of POS_t and NEG_t series, Shin et al. (2014) call specification like (3) as nonlinear ARDL. The path of estimation is the same as that of the linear ARDL specification in (2). The only difference is the leverage to study the asymmetric effects through the coefficients comparison that are attached to POS and NEG variables. At least three asymmetry hypotheses can be examined in the short run. First, short run asymmetric effects can be established if at each lag $\hat{\beta}_{6,j}$ differs from $\hat{\beta}_{7,j}$. Second, short run adjustment asymmetry is inferred if the number of optimum lags of (ΔPOS_t) are

[5] At any point *t* partial sum of positive changes is the same as cumulative sum in $\Delta \ln REX_t$ at time t where negative changes have been replaced by zeroes. Similarly, partial sum of negative changes is the same as cumulative sum where positive values in $\Delta \ln REX_t$ are replaced by zeroes. For details and formulation see Bahmani-Oskooee and Aftab (2017).

different than that of (ΔNEG_t). Third, cumulative impact asymmetry is determined through testing $\sum \hat{\beta}_{6,j} \neq \sum \hat{\beta}_{7,j}$. Finally, the long run hypothesis of asymmetric effects can be examined by testing $\frac{-\gamma_3}{\gamma_o} \neq \frac{-\gamma_4}{\gamma_o}$. The Wald test is recommended to test these later two inequalities.[6]

3. THE RESULTS

In this section we estimate both the linear model (2) and the nonlinear model (3) for each of the 31 industries that trade between Malaysia and Pakistan. These are the 2-digit industries that trade between the two countries and for which continuous monthly data over the period January 2000 - December 2017 were available. Due to space constraint in constructing tables, name of each industry does not appear in every table, but they appear in Table 3 and 7. In estimating each model, a maximum of eight lags are imposed on each first-differenced variable and Akaike's Information Criterion (AIC) is used to select optimum lags. Furthermore, we have collected required critical values in the notes to each table and have used them to identify the significance level of our estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. We begin with the estimate of the linear ARDL model (2) for each industry. Due to volume of the estimates while we report short-run coefficient estimates attached to the real exchange rate only in Table 1, long-run estimates are reported for all variables in Table 2. Finally, Table 3 reports diagnostic statistics associated with each linear model.

From Table 1 we gather that there are 16 industries in which there is at least one significant lagged coefficient, supporting short run effects of exchange rate changes on the trade balances of these industries. However, only in 10 industries short-run effects last into the long run. As can be seen from Table 2, there are 10 cases in which the real exchange rate carries a significant coefficient. While in industries coded 04, 12, 52, 54, and 75 the estimate is positive, in industries coded 07, 26, 69, 87, and 93 it is negative. Thus, ringgit depreciation against Pakistani rupee will improve the trade balance of first five industries which all together engage in almost 5% of the trade.[7] The later five industries which all together engage in 3.42% of the trade between Malaysia and Pakistan, must be industries in which import demand are inelastic.[8]

[6] For more on some other applications of these methods see Halicioglu (2007, 2008), Gogas and Pragidis (2015), Durmaz (2015), Baghestani and Kherfi (2015), Al-Shayeb and Hatemi-J. (2016), Lima et al. (2016), Nusair (2012, 2017), Aftab et al. (2016, 2017), Bahmani-Oskooee and Aftab (2017), Arize et al. (2017), and Gregoriou (2017).

[7] For trade share of each industry, refer to Table 3.

[8] For example, an inelastic Pakistani demand for Malaysian goods implies that as ringgit depreciates and Malaysian goods become cheaper, even though Malaysia exports more, her export earnings decline, hence M/X rises. Thus, as REX declines, M/X rises, hence a negative estimate.

Table 1. Short-Run of the Linear ARDL Model

Industry Code	Short-Run Coefficient Estimates							
	$\Delta \ln REX_t$	$\Delta \ln REX_{t-1}$	$\Delta lnREX_{t-2}$	$\Delta \ln REX_{t-3}$	$\Delta \ln REX_{t-4}$	$\Delta \ln REX_{t-5}$	$\Delta \ln REX_{t-6}$	$\Delta \ln REX_{t-7}$
03	-1.37(1.58)							
04	2.4(2.41)***							
05	-0.19(1.02)							
06	-0.2(1.12)							
07	0.19(0.28)	-0.38(0.38)	0.06(.06)	-1.13(1.15)	0.23(0.23)	-0.5(0.5)	0.01(0.01)	1.63(2.33)**
12	1.97(1.87)*							
26	0.83(1.2)	2.19(2.17)**	0.08(.08)	1.56(2.14)**				
27	0.25(0.33)	1.38(1.29)	0.73(0.68)	-2.07(2.74)***				
51	-0.1(0.93)							
52	0.71(3.07)***							
53	-0.01(0.06)							
54	0.33(1.93)*							
55	-1.15(1.87)*							
57	-0.15(1.44)							
59	-0.14(1.41)							
63	0.09(0.29)	0.11(.25)	0.45(1.06)	-0.84(1.95)*	-0.53(1.22)	0.99(3.2)***		
64	-0.09(0.52)							
65	0.35(1.18)	-0.39(.89)	-0.64(1.48)	0.88(2.83)***				
66	-0.41(0.86)	-0.16(0.24)	-0.95(1.43)	0.54(0.8)	0.78(1.59)			
69	0.77(0.93)	-1.01(1.16)						
74	0.08(0.14)	0.65(0.81)	-2.04(2.54)***	1.73(2.11)**	-1.63(1.99)**	1.3(2.26)**		
75	0.42(2.93)***							
76	-0.01(0.05)							
77	0.07(0.42)							
82	-0.95(0.99)	-4.22(3.08)***	2.25(1.61)	1.43(1.03)	-0.58(0.42)	0.42(0.3)	-1.53(1.56)	
83	-2.73(2.89)***	-1.9(1.34)	5.19(3.75)***	0.58(0.4)	-4.15(2.95)***	1.53(1.53)		
84	-0.25(1.22)							
85	0.02(0.08)							
87	-0.32(2.12)**							
89	-0.1(0.87)							
93	-0.06(1.69)*							

Notes: ***, **, * show the significance at 1%, 5% and 10%, respectively. In parenthesis is t-ratio in absolute form.

Table 2. Long-Run Estimates of the Linear ARDL Model

Industry Code	Long-Run Coefficient Estimates							
	Constant	DM^{GFC}	DM^{MPCEPA}	$\ln IPI^{ML}$	$\ln IPI^{PK}$	$\ln REX_t$	Constant	DM^{GFC}
03	3.21(1.59)	-0.1(1.11)	-0.04(0.39)	-1.63(-2.06)***	0.82(1.83)*	0.04(0.05)	3.21(1.59)	-0.1(1.11)
04	1.82(1.3)	0.07(1.26)	0.04(0.69)	-1.98(3.26)***	1.18(3.24)***	1.08(2.19)**	1.82(1.3)	0.07(1.26)
05	1.56(2.77)***	-0.05(2.35)***	0.11(4.65)***	0.74(1.87)*	-0.89(-3.16)***	-0.19(1.05)	1.56(2.77)***	-0.05(2.35)***
06	4.49(2.24)**	-0.18(2.29)**	0.12(1.35)	-1.08(1.18)	-0.22(0.4)	-0.77(1.11)	4.49(2.24)**	-0.18(2.29)**
07	3.67(6.41)***	0.01(0.19)	-0.02(0.68)	-1.16(5.41)***	0.33(2.53)***	-0.91(4.3)***	3.67(6.41)***	0.01(0.19)
12	-13.69(1.15)	0.041(0.07)	-0.27(0.47)	1.41(0.29)	0.68(0.21)	9.91(2.22)**	-13.69(1.15)	0.041(0.07)
26	3.22(3.16)***	-0.07(1.85)*	-0.02(0.37)	-0.55(1.26)	-0.09(0.32)	-0.74(2.05)**	3.22(3.16)***	-0.07(1.85)*
27	-1.79(1.55)	0.05(1.09)	0.07(1.51)	2.68(3.6)***	-1.51(2.95)***	0.19(0.49)	-1.79(1.55)	0.05(1.09)
51	1.2(1.17)	0.03(0.64)	0.17(3.79)***	0.25(0.64)	-0.33(1.4)	-0.35(0.98)	1.2(1.17)	0.03(0.64)
52	-2.43(1.84)*	-0.11(1.84)*	0.11(1.89)*	0.56(1.16)	0.15(0.52)	1.56(3.29)***	-2.43(1.84)*	-0.11(1.84)*
53	-0.07(0.11)	0.02(0.72)	-0.06(1.99)**	0.3(2.26)**	-0.34(2.71)***	-0.01(0.06)	-0.07(0.11)	0.02(0.72)
54	-0.11(0.2)	0.03(1.06)	0.01(0.35)	0.34(1.59)	-0.1(-0.83)	0.42(1.97)**	-0.11(0.2)	0.03(1.06)
55	2.28(1.19)	-0.15(1.82)*	0.08(0.92)	0.13(0.18)	-0.53(1.27)	-0.58(0.82)	2.28(1.19)	-0.15(1.82)*
57	1.43(1.48)	0.01(0.04)	-0.05(1.11)	-0.19(0.52)	0.12(0.57)	-0.53(-1.45)	1.43(1.48)	0.01(0.04)
59	1.61(2.75)***	-0.06(2.13)**	-0.01(0.02)	-0.06(0.29)	-0.1(0.78)	-0.29(1.42)	1.61(2.75)***	-0.06(2.13)**
63	0.94(1.5)	-0.03(1.35)	0.02(0.63)	-0.09(0.42)	-0.08(0.6)	0.06(0.28)	0.94(1.5)	-0.03(1.35)
64	2.76(2.17)**	-0.03(0.53)	0.02(0.29)	-1.17(2.3)**	0.39(1.33)	-0.24(.52)	2.76(2.17)**	-0.03(0.53)
65	1.81(3.39)***	-0.03(1.46)	-0.02(0.79)	-0.55(2.69)***	0.24(2.02)**	-0.09(0.44)	1.81(3.39)***	-0.03(1.46)
66	1.12(2.24)**	-0.02(0.84)	0.01(0.36)	-0.37(2.01)**	0.2(1.59)	-0.03(.16)	1.12(2.24)**	-0.02(0.84)
69	2.77(4.44)***	-.12(4.29)***	0.06(2.11)**	-0.32(1.39)	-0.28(2.12)**	-0.58(2.5)***	2.77(4.44)***	-0.12(4.29)***
74	0.9(1.46)	-0.04(1.6)	0.04(1.7)*	-0.14(0.66)	-0.07(0.52)	0.17(0.76)	0.9(1.46)	-0.04(1.6)
75	-1.88(1.91)**	0.1(2.26)***	-0.05(1.19)	0.61(1.71)*	-0.01(0.05)	1.13(3.13)***	-1.88(1.91)**	0.1(2.26)***
76	1.51(1.96)**	0.06(1.63)	0.15(2.94)***	-0.22(0.53)	-0.12(0.36)	-0.01(0.05)	1.51(1.96)**	0.06(1.63)
77	1.16(2.04)**	-0.01(0.57)	0.07(2.76)***	-0.37(1.2)	0.14(0.63)	0.09(0.42)	1.16(2.04)**	-0.01(0.57)
82	2.65(1.67)*	-0.13(1.94)**	0.11(1.47)	-0.79(.93)	0.03(0.05)	-0.06(0.11)	2.65(1.67)*	-.13(1.94)**
83	2.97(0.86)	-0.05(0.34)	-0.03(0.21)	-1.99(1.49)	1.4(1.68)*	-.52(0.4)	2.97(0.86)	-0.05(0.34)
84	2.41(2.13)**	-0.14(3.02)***	0.13(2.27)**	-0.25(0.42)	-0.14(0.3)	-0.51(1.27)	2.41(2.13)**	-0.14(3.02)***
85	3.07(1.79)*	-0.07(0.85)	0.03(0.38)	-0.99(1.53)	0.01(0.01)	0.05(0.08)	3.07(1.79)*	-0.07(0.85)
87	1.46(2.79)***	0.09(3.89)***	-0.04(1.57)	0.07(0.32)	-0.13(1.04)	-0.41(2.19)**	1.46(2.79)***	0.09(3.89)***
89	2.09(6.09)***	-0.01(0.61)	0.03(2.08)**	-0.13(0.97)	-0.36(4.7)***	-0.11(0.87)	2.09(6.09)***	-0.01(0.61)
93	2.72(7.26)***	-0.02(1.06)	0.05(2.57)***	-0.37(2.71)***	-0.33(3.88)***	-0.24(1.74)*	2.72(7.26)***	-0.02(1.06)

Notes: ***, **, * show the significance at 1%, 5% and 10%, respectively. In parenthesis is t-ratio in absolute form.

Table 3. Linear ARDL Model Diagnostic Statistics

Industry (Trade Share)	Diagnostics						
	F^a	ECM_{t-1}	Adj. R^2	LM	RESET	CU	CUQ
03-fish, crustaceans and molluscs, (1.44)	5.42**	-0.31(5.45)**	0.52	0.67	2.05	S	S
04-cereals and cereal preparations(1.91)	14.09**	-0.57(9.07)**	0.45	0.26	2.05	S	U
05-vegetables and fruits(1.39)	9.21**	-0.96(6.87)**	0.38	0.11	0.36	S	S
06-sugars, sugar preparations and honey(0.22)	2.72	-0.26(3.65)*	0.58	3.68*	0.01	S	S
07-coffee, tea, cocoa, spices, and manuf. n.es. (0.76)	30.42**	-0.93(13.41)**	0.28	0.48	2.66	S	S
12-tobacco and tobacco manufactures thereof(0.01)	2.73	-0.19(3.83)**	0.70	1.13	1.28	U	S
26-textile fibres(other than wooltops) n.e.s. (0.59)	12.94**	-0.55(8.86)**	0.41	1.40	1.97	S	S
27-crude fertilizers and crude minerals n.e.s. (0.16)	6.11**	-0.59(5.66)**	0.47	2.62	2.87*	S	S
51-organic chemicals(5.23)	3.87*	-0.29(4.63)**	0.82	0.11	2.91*	S	S
52-inorganic chemicals(0.17)	6.17**	-0.46(6.03)**	0.48	0.25	2.10	S	U
53-dyeing, tanning and colouringmaterials(0.37)	7.02**	-0.52(6.68)**	0.23	0.07	1.67	S	S
54-medicinal and pharmaceutical products(0.38)	12.55**	-0.78(8.67)**	0.06	0.43	0.05	S	S
55-essential oils and resinoids and perfume materials n.e.s. (1.4)	3.03	-0.23(4.13)**	0.58	0.40	0.01	U	S
57-plastics in primary forms(1.88)	5.83**	-0.29(5.92)**	0.55	0.21	0.04	S	S
59-chemical materials and products,n.e.s.(1.67)	8.92**	-0.46(6.54)**	0.52	0.91	0.93	S	S
63-cork and wood manufactures (excluding furniture)(1.71)	4.74**	-0.37(5.12)**	0.48	0.23	2.74*	S	S
64-paper, paperboard, and articlesof paper pulp, n.e.s.(0.31)	8.28**	-0.39(6.96)**	0.44	1.52	2.70	S	S
65-textile yarn, fabrics, made-uparicles, n.e.s. (5.46)	10.78**	-0.43(7.61)**	0.54	0.46	0.22	S	S
66-non-metallic mineral manufacturesn.e.s.(0.59)	6.13**	-0.67(5.43)**	0.21	1.81	0.01	S	S
69-manufactures of metal, n.e.s.(0.32)	32.02**	-0.95(13.73)**	0.15	1.83	0.05	S	S
74-general industrial machinery and equipment n.e.s.(3.13)	17.92**	-0.69(10.36)**	0.19	0.45	1.44	S	S
75-office machines and automatic data processing n.e.s.(2.43)	4.57**	-0.37(5.15)**	0.45	0.03	1.72	S	S
76-telecommunications and sound recording n.e.s.(1.2)	9.16**	-0.58(7.1)**	0.45	1.14	0.58	S	S
77-electrical machinery, apparatus and appliances, n.e.s. (0.9)	22.99**	-0.82(11.69)**	0.17	1.26	1.78	S	S
82-furniture and parts thereof(0.15)	6.22**	-0.45(6.07)**	0.31	0.14	2.43	U	S
83-travel goods, handbags and similarcontainers(0.03)	3.22	-0.21(3.87)**	0.55	0.74	1.51	S	S
84-articles of apparel and clothingaccessories(1.89)	6.11**	-0.47(5.95)**	0.39	1.23	0.41	U	S
85-footwear(0.18)	8.95**	-0.41(7.23)**	0.46	0.66	2.60	S	S
87-professional, scientificandcontrolling instruments n.e.s.(1.19)	11.49**	-0.77(8.21)**	0.19	1.29	0.15	S	S
89-miscellaneous manufactured articles, n.e.s.(1.25)	29.78**	-0.94(14.01)**	0.33	0.16	0.37	S	S
93-special transactions and commodities(0.56)	2.81	-0.26(4.63)**	0.89	0.11	2.54	S	S

Notes: (a) At the 10% (5%) significance level when there are three exogenous variables (k=3), the critical value of the F test is 3.77 (4.35). These come from Pesaran et al. (2001, Table CI-Case III, page 300). * (**) indicates a significant statistic at the 10% (5%) level. (b) LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom (first order). Its critical value at 10% (5%) level is 2.71 (3.84). (c) RESET is Ramsey's test for misspecification. It is distributed as χ^2 with one degree of freedom and its critical value at 10% (5%) level is 2.71 (3.84). (d) CU and CUQ are CUSUM and CUSUMQ respectively to test for stability of all coefficients. (e) Number inside the parenthesis next to ECMt-1 is the absolute value of the t-ratio. Its critical value at the 10% (5%) significance level is -3.46 (-3.78). These come from Pesaran et al. (2001, Table CII-Case III, page 303). (f) Abbreviation n.e.s. stands for not elsewhere defined. (g) Trade share is in percentage calculated for the year 2017.

These long-run estimates are valid since the F test for cointegration (in Table 3) is significant in all 10 industries except in 12. However, in industry 12 the alternative test known as the ECM_{t-1} or the t-test for cointegration is significant.[9] Indeed, one of the two tests is significant in all industries since at least one of the long-run estimates is significant in every industry except 57 and 63. It appears that level of economic activities play significant role in half of the industries and 2008 Global Financial Crisis dummy in 11 and economic partnership between the two countries dummy, also in 11 industries. The latter dummy (DM^{MPCEPA}) carries significantly positive coefficient in 10 industries coded 05, 51, 52, 69, 74, 76, 77, 84, 89, and 93, implying that introduction of the agreement has benefitted Pakistan in these 10 industries that engage in a total of 15.48% of the trade. Only a small Malaysian industry 53 has benefitted from the agreement.

Five additional diagnostic statistics are also reported in Table 3. The Lagrange multiplier (LM) statistic is reported to check for serial correlation among the residuals of each optimum model. As can be seen it is hardly significant in any industry, supporting autocorrelation free residuals in all models. We have also reported Ramsey's RESET test results and again, this statistic is also insignificant in almost all models, supporting correctly specified optimum models. To test for stability of short-run and long-run coefficient estimates, we have applied the well-known CUSUM and CUSUMSQ tests and reported the outcome in two columns headed as CU and CUQ, respectively. Stable coefficients are identified by "S" and unstable ones by "U" and they clearly indicate that in most models estimates are stable. Finally, to judge the goodness of the fit, we have reported the size of adjusted R^2. How would the results change if we move to estimates of the nonlinear model? These results are reported in Tables 4-7.

The short-run coefficient estimates obtained for ΔPOS and ΔNEG are reported in Tables 4 and 5, respectively, reveal that at least one of these partial sum variables carry a significant coefficient in 19 industries. Although number of industries has increased marginally (from 16 in the linear models to 19 in the nonlinear models), size of the coefficient estimates attached to both partial sum variables differ at the same lag order, supporting short-run asymmetric effect of appreciation versus depreciation almost in all industries. However, the sum of coefficients attached to ΔPOS is significantly different than the sum attached to ΔNEG only in industries coded 06, 07, 27, 55, 63, 65, 75, 82, and 85, supporting short-run cumulative or impact asymmetric effects of exchange rate changes.

[9] Under this alternative test we use the normalized long-run estimates and equation (1) to generate the error terms. Calling the error vector, ECM, we then replace the linear combination of the lagged level variables in (2) by ECM_{t-1} and estimate the new specification at the same optimum lag orders. A significantly negative coefficient attached to ECM_{t-1} will support convergence of the variables to their long-run values or cointegration. Since t-test is used to judge significance of this estimate, the test is also known as the t-test. Like the F test, Pesaran et al. (2001, p. 303) tabulate new critical values which, again, account for integrating properties of variables.

Table 4. Short-Run Estimates (Appreciation) from Nonlinear ARDL Model

Industry	Short-Run Coefficient Estimates							
Code	ΔPOS_t	ΔPOS_{t-1}	ΔPOS_{t-2}	ΔPOS_{t-3}	ΔPOS_{t-4}	ΔPOS_{t-5}	ΔPOS_{t-6}	ΔPOS_{t-7}
03	-2.66(1.72)*							
04	3.41(1.89)*							
05	-0.28(0.75)							
06	0.22(0.18)	0.13(0.07)	0.29(0.17)	-2.65(2.1)**				
07	1.22(.97)	-0.28(0.15)	-0.21(0.11)	-1.92(1.01)	-0.57(0.3)	-0.03(0.02)	-0.83(0.43)	3.1(2.4)***
12	-2.11(1.31)							
26	0.25(0.19)	-3.68(1.93)*	-1.13(.58)	3.44(2.61)***				
27	1.17(2.58)***							
51	0.17(0.76)							
52	0.38(0.85)							
53	0.21(0.89)							
54	0.14(0.46)							
55	1.09(3.48)***							
57	-0.21(1.07)							
59	-0.08(0.39)							
63	-0.04(0.06)	-0.73(0.82)	-0.32(0.36)	-1.28(1.41)	1.68(2.75)***			
64	-0.06(0.17)							
65	0.94(1.76)**	-0.3(0.36)	-1.06(1.26)	1.31(2.28)**				
66	0.31(1.08)							
69	-0.62(1.55)							
74	1.94(1.83)*							
75	0.72(0.75)	2.03(2.09)**						
76	0.13(0.36)							
77	1.19(1.07)	-0.68(0.39)	1.46(0.83)	-4.92(2.76)***	3.99(3.32)***			
82	-1.21(0.69)							
83	-3.11(1.66)*	3.66(1.86)*						
84	1.95(1.33)	-2.67(1.84)*						
85	2.09(1.04)	4.55(2.13)**						
87	-0.26(0.94)							
89	-0.35(1.56)							
93	-0.04(0.65)							

Notes: ***, **, * show the significance at 1%, 5% and 10%, respectively. In parenthesis is t-ratio in absolute form.

Table 5. Short-Run Estimates (Depreciation) from Nonlinear ARDL Model

Industry Code	Short-Run Coefficient Estimates							
	ΔNEG_t	ΔNEG_{t-1}	ΔNEG_{t-2}	ΔNEG_{t-3}	ΔNEG_{t-4}	ΔNEG_{t-5}	ΔNEG_{t-6}	ΔNEG_{t-7}
03	-0.08(0.29)							
04	0.4(1.17)							
05	-0.23(0.98)							
06	0.24(1.02)							
07	-0.43(1.84)*							
12	0.89(0.82)							
26	1.95(1.66)*							
27	0.03(0.02)	2.44(1.52)	0.95(0.59)	-3.7(3.19)***				
51	0.01(0.01)							
52	0.57(2.01)**							
53	0.08(0.54)							
54	0.25(1.29)							
55	-2.41(2.61)***							
57	-0.17(1.41)							
59	-0.11(0.92)							
63	0.08(0.16)	0.89(1.27)	1.02(1.46)	-0.63(0.89)	-2.22(3.31)***	1.86(3.96)***		
64	-0.08(0.37)							
65	-0.01(0.08)							
66	-0.35(0.48)	-0.44(0.43)	-1.41(1.39)	2.15(2.88)***				
69	1.88(1.44)							
74	-1.63(1.75)*	2.01(1.64)*	-3.77(3.07)***	2.78(2.24)**	-2.76(2.25)**	2.01(2.27)**		
75	0.26(1.42)							
76	0.01(0.02)							
77	0.01(0.01)							
82	-0.27(0.17)	-7.72(3.78)***	2.71(1.28)	3.29(1.58)	-1.03(.51)	1.47(.72)	-3.76(2.56)***	
83	-2.79(1.73)*	-5.31(2.33)**	7.29(3.44)***	1.17(.54)	-3.65(2.31)**			
84	-1.43(1.18)	3.63(2.19)**	-3.26(2.85)***					
85	-3.64(2.05)**	-5.7(2.32)**						
87	-0.29(1.66)*							
89	-0.20(1.43)							
93	-0.05(1.27)							

Notes: ***, **, * show the significance at 1%, 5% and 10%, respectively. In parenthesis is t-ratio in absolute form.

Table 6. Long-Run Coefficient Estimates of Nonlinear ARDL Model

Industry	Long-Run Coefficient Estimates						
Code	Constant	DM^{GFC}	DM^{MPCEPA}	$lnIPI^{ML}$	$lnIPI^{PK}$	POS_t	NEG_t
03	2.96(2.05)**	-0.13(1.14)	0.04(0.22)	-1.46(1.81)*	0.82(1.82)*	-0.52(0.4)	-0.24(0.28)
04	2.37(2.48)***	0.01(0.22)	0.19(1.63)*	-1.7(2.8)***	1.27(3.64)***	-0.03(0.03)	0.67(1.19)
05	1.31(3.21)***	-0.05(1.83)*	0.12(2.61)***	0.75(1.89)*	-0.89(3.11)***	-0.29(0.77)	-0.23(1.01)
06	2.04(2.42)***	-0.07(1.19)	-0.23(0.24)	1.87(2.23)**	-2.55(4.18)***	1.38(1.73)*	0.51(1.03)
07	2.49(6.59)***	0.03(1.01)	-0.09(1.76)*	-1.05(4.87)***	0.26(2.05)**	-0.23(0.58)	-0.46(1.84)*
12	-11.75(1.98)**	-0.09(2.24)**	2.23(2.98)***	5.69(1.6)	1.53(.69)	-7.36(1.28)	3.12(0.86)
26	2.52(3.21)***	-0.02(0.31)	-0.14(1.41)	-0.65(1.27)	-0.1(0.34)	0.25(0.33)	-0.22(.46)
27	-0.83(1.3)	0.12(2.52)***	-0.12(1.59)	2.28(3.88)***	-1.54(3.69)***	1.64(2.58)***	0.84(2.06)**
51	1.23(1.88)*	0.08(1.45)	0.05(0.49)	0.03(0.07)	-0.34(1.65)*	0.52(0.77)	0.01(0.01)
52	-0.95(1.01)	-0.16(1.97)**	0.21(1.64)*	0.69(1.37)	0.18(0.64)	0.83(0.86)	1.25(2.11)**
53	0.13(0.29)	0.05(1.27)	-0.12(1.98)**	0.48(1.93)*	-0.22(1.46)	0.39(0.89)	0.15(0.54)
54	0.24(0.58)	0.01(0.39)	0.04(0.8)	0.39(1.74)*	-0.08(0.65)	0.18(0.46)	0.32(1.29)
55	3.72(5.24)***	0.07(1.17)	-0.39(3.99)***	-0.93(2.47)***	-0.59(2.72)***	2.59(3.61)***	0.66(1.45)
57	0.72(1.01)	-0.01(0.17)	-0.03(0.29)	-0.15(0.38)	0.14(0.62)	-0.71(1.07)	-0.6(1.41)
59	1.32(3.19)**	-0.05(1.56)	-0.02(0.29)	-0.09(0.4)	-.1(0.78)	-0.17(0.38)	-0.24(0.89)
63	0.87(1.93)**	-0.06(1.48)	0.07(0.96)	-0.01(0.01)	-0.09(0.66)	-0.32(0.56)	-0.1(0.31)
64	2.54(2.68)***	-0.02(0.34)	0.01(0.03)	-1.19(2.22)**	0.39(1.28)	-0.14(0.17)	-0.21(0.37)
65	1.61(4.29)***	-0.04(1.3)	-0.02(0.37)	-0.49(2.37)***	0.23(1.89)**	-0.05(0.15)	-0.02(0.08)
66	1.02(3.13)***	-0.04(1.38)	0.08(1.47)	-0.33(1.78)*	0.21(1.73)*	-0.43(1.08)	-0.19(0.81)
69	2.06(4.49)***	-0.12(3.41)***	0.07(1.27)	-0.3(1.22)	-0.28(2.04)**	-0.66(1.56)	-0.62(2.25)**
74	1.24(2.93)***	-0.06(1.61)	0.06(1.05)	-0.29(1.25)	0.02(0.15)	.034(0.07)	0.1(0.34)
75	-0.79(1.11)	0.01(0.24)	0.08(0.92)	0.67(1.45)	0.07(0.26)	0.08(0.11)	0.63(1.48)
76	2.06(3.78)***	0.08(1.82)*	0.1(1.51)	-0.73(1.62)*	0.12(0.36)	0.2(0.36)	0.01(0.02)
77	1.01(2.59)***	-0.03(0.87)	0.11(2.08)**	-0.09(0.39)	-0.02(0.18)	-0.13(0.33)	0.01(0.01)
82	2.56(2.85)***	0.02(0.27)	-0.19(1.48)	-0.23(0.31)	-0.67(1.18)	2.56(2.4)***	1.34(1.93)**
83	2.01(0.84)	-0.04(0.23)	-0.07(0.21)	-1.71(1.25)	1.25(1.56)	-0.15(0.06)	-0.15(0.09)
84	2.05(3.19)***	0.01(0.13)	-0.13(1.44)	0.51(0.94)	-1.15(2.61)***	2.05(2.69)***	0.82(1.69)
85	4.21(3.53)***	0.01(0.02)	-0.18(1.17)	-1.63(2.53)***	0.04(0.12)	1.56(1.32)	0.69(0.91)
87	1.03(2.72)***	0.09(3.15)***	-0.05(1.02)	0.05(0.22)	-0.14(1.06)	-0.33(0.95)	-.38(1.69)*
89	1.83(7.36)***	-0.03(1.29)	0.07(2.2)**	-0.07(.53)	-0.34(4.35)***	-0.37(1.57)	-0.22(1.44)
93	2.48(9.38)***	-0.01(0.6)	0.03(1.02)	-0.39(2.72)***	-0.34(3.92)***	-0.17(0.65)	-0.21(1.27)

Notes: ***, **, * show the significance at 1%, 5% and 10%, respectively. In parenthesis is t-ratio in absolute form.

Table 7. Nonlinear Model Diagnostic Statistics

Industry (Trade Share)	Diagnostics								
	F	ECM_{t-1}	Adj. R^2	LM	RESET	CU	CUQ	Wald-S	Wald-L
03-fish, crustaceans and molluscs, (1.44)	4.75**	-.31(5.55)**	0.51	0.48	2.14	S	S	0.34	0.11
04-cereals and cereal preparations(1.91)	13.54**	-.6(9.59)**	0.45	0.09	1.37	S	U	0.26	2.57
05-vegetables and fruits(1.39)	7.88**	-.96(6.85)**	0.38	0.11	0.15	S	S	1.40	0.19
06-sugars, sugar preparations and honey(0.22)	9.28**	-.47(7.96)**	0.61	0.30	0.78	S	S	4.67**	5.05**
07-coffee, tea, cocoa, spices, and manuf. n.es. (0.76)	20.72**	-.94(13.53)**	0.29	0.58	1.41	S	S	7.82***	1.6
12-tobacco and tobacco manufactures thereof(0.01)	3.49	-.28(4.99)**	0.72	0.75	0.01	S	S	0.01	9.18***
26-textile fibres(other than wooltops) n.e.s. (0.59)	6.71**	-.5(6.93)**	0.42	0.24	2.23	S	S	0.89	1.27
27-crude fertilizers and crude minerals n.e.s. (0.16)	6.64**	-.71(6.54)**	0.49	3.74*	1.26	S	S	4.79**	7.48***
51-organic chemicals(5.23)	3.58	-.32(4.78)**	0.82	0.03	2.18	S	S	0.70	0.89
52-inorganic chemicals(0.17)	5.4**	-.45(6.04)**	0.48	0.46	2.25	S	U	0.07	0.62
53-dyeing, tanning and colouringmaterials(0.37)	6.34**	-.52(6.75)**	0.23	0.09	2.25	U	S	0.79	1.68
54-medicinal and pharmaceutical products(0.38)	10.97**	-.78(8.69)**	0.06	0.34	0.01	S	S	0.43	0.81
55-essential oils and resinoids and perfume materials n.e.s. (1.4)	8.21**	-.42(7.71)**	0.62	0.83	0.21	S	S	7.51***	18.63***
57-plastics in primary forms(1.88)	4.98**	-.28(5.89)**	0.55	0.22	0.06	S	S	0.96	0.14
59-chemical materials and products,n.e.s.(1.67)	7.63**	-.47(5.99)**	0.52	0.85	1.01	S	S	0.06	1.35
63-cork and wood manufactures (excluding furniture)(1.71)	4.07*	-.35(4.86)**	0.50	0.31	6.16**	S	S	28.23***	0.01
64-paper, paperboard, and articlesof paper pulp, n.e.s.(0.31)	7.06**	-.39(6.94)**	0.44	0.71	2.69	S	S	0.02	0.04
65-textile yarn, fabrics, made-uparicles, n.e.s. (5.46)	9.2**	-.43(7.61)**	0.54	0.51	0.35	S	S	3.66**	0.63
66-non-metallic mineral manufacturesn.e.s.(0.59)	5.7**	-.71(5.63)**	0.23	1.07	0.05	S	S	1.52	0.00
69-manufactures of metal, n.e.s.(0.32)	26.97**	-.93(13.59)**	0.15	1.43	0.02	U	S	1.48	0.29
74-general industrial machinery and equipment n.e.s.(3.13)	14.3**	-.66(9.99)**	0.20	0.09	1.95	S	S	0.41	0.30
75-office machines and automatic data processing n.e.s.(2.43)	5.31**	-.41(5.88)**	0.47	1.01	0.39	S	S	3.84**	2.86*
76-telecommunications and sound recording n.e.s.(1.2)	8.45**	-.62(7.34)**	0.45	0.95	0.74	U	S	1.30	2.20
77-electrical machinery, apparatus and appliances, n.e.s. (0.9)	21.01**	-.82(12.02)**	0.18	0.08	1.37	S	S	2.74*	0.12
82-furniture and parts thereof(0.15)	6.28**	-.52(6.49)**	0.35	0.04	2.04	S	S	5.15**	4.79**
83-travel goods, handbags and similarcontainers(0.03)	2.83	-.21(3.93)**	0.55	0.84	2.75*	S	S	1.04	0.01
84-articles of apparel and clothingaccessories(1.89)	6.52**	-.56(6.49)**	0.45	0.13	1.03	S	S	1.28	9.87***
85-footwear(0.18)	8.0**	-.44(7.56)**	0.49	0.28	1.78	S	S	5.18**	2.03
87-professional, scientificandcontrolling instruments n.e.s.(1.19)	9.81**	-.77(8.19)**	0.18	0.57	0.15	S	S	0.58	0.07
89-miscellaneous manufactured articles, n.e.s.(1.25)	25.99**	-.95(14.08)**	0.34	0.14	1.01	S	S	0.15	0.06
93-special transactions and commodities(0.56)	2.40	-.26(4.62)**	0.89	0.08	2.30	S	S	2.36	0.38

Notes: (a) At the 10% (5%) significance level when there are three exogenous variables (k=3), the critical value of the F test is 3.77 (4.35). These come from Pesaran et al. (2001, Table CI-Case III, page 300). * (**) indicates a significant statistic at the 10% (5%) level. (b) LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom (first order). Its critical value at 10% (5%) level is 2.71 (3.84). (c) RESET is Ramsey's test for misspecification. It is distributed as χ^2 with one degree of freedom and its critical value at 10% (5%) level is 2.71 (3.84). (d) CU and CUQ are CUSUM and CUSUMQ respectively to test for stability of all coefficients. (e) Number inside the parenthesis next to ECMt-1 is the absolute value of the t-ratio. Its critical value at the 10% (5%) significance level is -3.46 (-3.78). These come from Pesaran et al. (2001, Table CII-Case III, page 303). (f) Abbreviation n.e.s. stands for not elsewhere defined. (g) Trade share is in percentage calculated for the year 2017.

Only, in these nine industries the Wald test reported as Wald-S in the diagnostics Table 7 is significant.[10] In how many industries short-run effects last into the long run?

From the long-run estimates of each nonlinear model reported in Table 6 we gather that either the POS variable or the NEG variable carry a significant and meaningful coefficient in nine industries coded 06, 07, 27, 52, 55, 69, 82, 84, and 87. The evidence against ringgit appreciation is clear. It will hurt the trade balance of industries coded 06, 27, 55, 82, and 84 since in these industries the POS variable carries a significantly positive coefficient. Ringgit depreciation, however, will improve the trade balance of 27, 52, and 82 since the NEG variable carries a significantly positive coefficient. Of course, ringgit depreciation will also worsen the trade balance of 07, 69, and 87 since the NEG variable carries a significantly negative coefficient in these industries. As mentioned before, this could be due to inelastic import demands. The long-run effects are asymmetric only in industries coded 06, 12, 27, 55, 75, 82, and 84, since the Wald test reported as Wald-L in Table 7 is significant in these cases, rejecting equality of normalized long-run estimates attached to the POS and NEG variables.

As for the long-run effects of other variables, again, two measures of economic activities seem to play more role than the exchange rate. At least one is significant in 19 industries. Similarly, the trade agreement dummy carries a significant coefficient in nine industries and the agreement seems to benefit Malaysia in industries coded 07, 53, and 55 and Pakistan in 04, 05, 12, 52, 77, and 89. Other diagnostic statistics reported in Table 7 are similar to those of the linear models and need no repeat here.

4. SUMMARY AND CONCLUSION

In 2007 Malaysia and Pakistan signed a free trade agreement with a hope that the agreement will benefit both countries. Since different industries trade different goods between the two countries, it is possible that some industries could benefit in Malaysia and some in Pakistan. One way to judge which industry in which country has benefitted from the agreement is to look at their trade flows over time. However, this approach will leave the other major determinants such as the level of economic activity or the real exchange rate out of the picture and yield misleading conclusions.

In this paper we identify 31 industries that trade between Malaysia and Pakistan and for which continuous monthly time series data are available. In order to assess the effects of the 2007 Free Trade Agreement, we include a dummy variable in the trade balance model of each industry in addition to main determinants of the trade balance. Following the literature, we estimate linear and nonlinear versions of the models for

[10] Note also that there is evidence of short-run adjustment asymmetry in industries coded 06, 07, 26, 27, 63, 65, 66, 74, 75, 77, 82, 83, and 84. Lag order assigned to ΔPOS is significantly different than the order assigned to ΔNEG.

each industry to identify the benefiting industries. Combining the results together from both models, we find that three Malaysian industries and 12 Pakistani industries benefitted from the trade agreement. The three Malaysian industries were: 07 (Coffee, tea, cocoa, etc. with 0.76% share of trade), 53 (Dyeing, tanning, etc. with 0.37% trade share) and 55 (Essential oil, etc. with 1.4% trade share) and the 12 Pakistani industries were 04 (cereals and cereals preparations with 1.91% trade share), 05 (Vegetables and fruits with 1.39% trade share), 12 (Tobacco, etc. with 0.01% trade share), 51 (Organic chemicals with 5.23% trade share), 52 (inorganic chemicals with 0.17% trade share), 69 (Manufacturers of metal with 0.32% trade share), 74 (General industrial machinery with 3.13% trade share), 76 (Telecommunications and sound recording with 1.2% trade share), 77 (Electrical machinery, etc. with 0.9% trade share), 84 (Articles of apparel, etc. with 1.89% trade share), 89 (Miscellaneous manufactured articles with 1.25% trade share), and 93 (Special transactions with 0.56% trade share). Clearly, Pakistan has benefitted more than Malaysia.

Additional analysis revealed that while the level of economic activity in both countries played a significant long-run role in 2/3rd of the industries, the real ringgit-rupee rate had short run asymmetric effects in almost all 31 industries, but long-run asymmetric effects in less than 1/3rd of the industries, though the results were industry specific. More precisely, we found that while ringgit appreciation will hurt five industries in Malaysia, ringgit appreciation will help only three industries. An important policy implication of our findings is that trade agreements and economic activity have relatively more role to play than the exchange rate.

APPENDIX

A1. Data Source

Monthly data over the period January 2000 – December 2017 (216 observations) are used to carry out the empirical exercise. The data come from the following sources:

a. *METS (Malaysian External Trade Statistics) Online*
b. *Thomson Reuters' Datastream*

A2. Variable

M_i / X_i Trade balance of industry *i* defined as the ratio of Malaysian imports from Pakistan over its exports to Pakistan. The sample covers 31 trading industries on the basis of Standard International Trade Classification (SITC) 2-digit level (source *a*).

DM^{FC}	Dummy variable to capture the Global Financial Crisis effect of 2008. It takes a value of 1 during January-2008 to December-2009 and zero otherwise.
TL_{MPCEPA}	Dummy variable that takes value of zero before January-2008[11] and one onwards from January-2008. This measures the trade liberalization effect.
IP^{ML}	Industrial production index of Malaysia is used to proxy for economic activity in Malaysian economy (source *b*).
IP^{PK}	Industrial production index of Pakistan measures the economic activity in Pakistani economy (source *b*).
REX	Real bilateral exchange rate defined as (P^{ML}. NEX)/P^{PK} where P^{ML} and P^{PK} are the CPI indexes in Malaysia and Pakistan respectively and NEX is the number of Pakistani rupees per unit of Malaysian ringgit. Thus, a decline reflects a depreciation of ringgit against rupee. All data come from source *b*.

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[11] Though MPCEPA was agreed on November 8, 2007, it was implemented on January 1, 2008.

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