Asian Journal of Economic Modelling
ISSN(e): 2312-3656
ISSN(p): 2313-2884
DOI: 10.55493/5009.v11i2.4835
Vol. 11, No. 2, 117-137.

URL: www.aessweb.com

Depreciation to correct trade deficit- a misdirected policy: Empirical evidence from Pakistan

Hafsa Hina[1]
Qazi Muhammad Adnan Hye[2]
Jabbar Ul-Haq[3+]

[1]*School of Social Sciences, Pakistan Institute of Development Economics, Quaid-e-Azam University Campus, Islamabad 44000, Pakistan.*
Email: hafsahina@pide.org.pk
[2]*Academic Research and Development Wing, Dubai, United Arab Emirates.*
Email: adnan.econ@gmail.com
[3]*Department of Economics, University of Sargodha, Sargodha 40100, Pakistan.*
Email: jabbar.ulhaq@uos.edu.pk

(+ Corresponding author)

Article History
Received: 20 January 2023
Revised: 26 June 2023
Accepted: 17 July 2023
Published: 1 August 2023

Keywords
Cointegration
Exports
Imports
Marshall-Lerner condition
Real exchange rate
Structural break
Trade balance.

JEL Classification:
C13; C22; F10.

ABSTRACT

A favorable trade balance is a positive indicator for emerging economies, and rectifying trade imbalances is paramount for every country. However, fixing trade deficits by depreciating the currency is a misguided policy approach. This study refutes this myth by computing the elasticity of Pakistan's exports, imports, and trade balance using the real exchange rate. It also examines the degree to which trade elasticities respond to changing trade regimes and exchange rate policies in Pakistan from 1982 to 2019. The structural break cointegration technique is used for empirical analysis. The vector error correction model (VECM) is also employed in the study to establish long-run and short-run relationships. The findings show that depreciation boosts import demand rather than export demand, hence worsening the trade balance. As a result, the study dismisses the presence of the J-curve in the case of Pakistan. According to this analysis, the exchange rate policy has little bearing on the economy's structure, and the necessity for a devaluation results from economic structural inefficiencies rather than trade-enhancing policies. The government and policymakers should reform the economy rather than let the currency depreciate.

Contribution/Originality: This study employed Johansen, Mosconi, and Nielsen's (2000) structural break cointegration technique to estimate the long-run and short-run relationships among the real imports, real exchange rate, and real domestic income and the real exports, real exchange rate, and real foreign income. The trade elasticities under different trade regimes and exchange-rate policies are also estimated.

1. INTRODUCTION

Exchange rate variation is a dominant endogenous factor that affects not only the current account balance but also economic performance (EP) due to its influence on macroeconomic variables such as outputs, imports, export prices, interest rates, and inflation rates (Frenkel, 2004; Iyoboyi & Muftau, 2014; Jin, 2008). A plausible exchange rate (henceforth ER) policy and a suitable ER are essential for enhanced EP (Chong & Tan, 2008). However, free-floating ER systems or those wholly determined by market forces are uncommon. In a managed floating regime, monetary authorities occasionally intervene in the foreign exchange market to achieve strategic objectives (Mordi, 2006).

In trade literature, Currency depreciation (appreciation) has been widely studied as a policy tool to improve a country's trade balance (TB), particularly for countries with persistent trade deficits (TD) (Aftab & Aurangzeb, 2002;

Agenor, 1991; Alexander, 1952; Brahmasrene & Jiranyakul, 2002; Galebotswe & Andrias, 2011; Iyoboyi & Muftau, 2014; Rawlins & Praveen, 1993; Xin, Chibsah, & Garti, 2020). Alexander (1952) suggests that the trade balance improved because consumers switched from foreign to domestic goods after currency devaluation. According to Krugman and Taylor (1978), nominal devaluation increases expenditure switching, which boosts tradable goods production, exports, and the foreign sector. However, there could be a causal relationship running from a current account deficit or surplus to currency depreciation or appreciation, so that currency depreciation does not improve a current account deficit. The Marshall-Lerner (ML) condition and the J curve effect are the main topics of research in this field (Bano, Raashid, & Rasool, 2014; Demirden & Pastine, 1995; Hacker & Hatemi-J, 2003; Narayan, 2004; Rose, 1991; Saeed & Hussain, 2013). According to the ML condition, depreciation improves TB if the sum of export elasticity and import elasticity is greater than one.

Although there is a well-established theoretical connection between currency depreciation (CD) and current account balance, especially in the developed world, the global trade imbalances in 2000 triggered considerable interest and debate (Bernanke, 2005; Blanchard & Milesi-Ferretti, 2012). Several empirical studies on the impact of ERs on the balance of payments (BOP) have yielded contradictory results. While some studies have discovered a deleveraging effect of ER depreciation on domestic output, which has a negative effect on the BOP position (e.g., (Agenor, 1991; Alejandro, 1963; Kandil, 2004)), others have discovered stimulating effects of ER depreciation on output and trade balance (Bahmani-Oskooee & Kandil, 2007; Balassa, Voloudakis, Fylaktos, & Suh, 1989; Narayan, 2004; Rahman & Islam, 2006; Reis Gomes & Senne Paz, 2005; Soleymani, Chua, & Saboori, 2011). Alawattage (2009) demonstrated that the real effective ER had little effect on Sri Lanka's TB, particularly in the short run.

In order to validate the ML condition, Boyd, Caporale, and Smith (2001), Onafowora (2003), and Bahmani-Oskooee, Harvey, and Hegerty (2014) used the BOP approach to evaluate the TB function. This approach is misleading because it only considers the net change in the TB and does not account for the active responsiveness of each export and import function to an ER shock (Xin et al., 2020).

Several empirical studies have shown that CD improves TB and that export and import demand change in response to changes in ER (Anju & Uma, 1999; Bahmani-Oskooee & Zhang, 2013; Balassa et al., 1989; Goldstein & Khan, 1978; Musawa, 2014; Narayan, 2004; Rahman & Islam, 2006; Reis Gomes & Senne Paz, 2005; Soleymani et al., 2011). However, several empirical studies have also refuted the efficiency of depreciation in addressing the TD problem (Ayen, 2014; Bahmani-Oskooee & Gelan, 2012; Bahmani-Oskooee & Kutan, 2009; Galebotswe & Andrias, 2011; Miles, 1979; Rose, 1991; Yazici, 2006).

Senhadji and Montenegro (1999) and Wang and Lee (2012) directly determined the price elasticity (PEX) of each sector using the elasticity approach. Elasticities reflect the economic structure. This method permits the calculation of each sector's PEX, which facilitates policymaking for each sector. This study calculates the elasticity of exports, imports, and TB to Pakistan's real ER to disprove the myth that correcting trade deficits through ER depreciation is a suitable policy tool. The findings indicate that devaluation increases import demand, not export demand, worsening the TB. This study refutes the existence of the J-curve in Pakistan.

This study adds to the empirical literature on Pakistan in four ways: (1) It calculates the short-run and long-run elasticities of the import demand function based on three variables: real imports, real ER, and real domestic income; (2) It calculates the export demand function based on three variables: real exports, real ER, and real foreign income; (3) It uses the Johansen et al. (2000) structural break cointegration technique to estimate the long-run and short-run relationships; and (4) It investigates the responsiveness of trade elasticities under different trade regimes and ER policies in Pakistan.

The remaining sections of the paper are structured as follows: Section 2 examines empirical literature on foreign trade and ERs to document exports and imports' responses to income, relative prices, and ER. Section 3 discusses Pakistan's different trade regimes and trade liberalization strategies and measures. Sections 4 and 5 discuss the theoretical framework and econometric approach. Section 6 describes data and variable construction, while sections 7 and 8 present empirical findings.

2. REVIEW OF EMPIRICAL STUDIES

The conventional theory of international trade holds that the nominal depreciation or appreciation of a country's currency has a direct and unremitting influence on its trade balance (Aftab & Aurangzeb, 2002; Bahmani-Oskooee, 2001; Bahmani-Oskooee & Malixi, 1992; Bahmani-Oskooee & Ratha, 2004; Musila & Newark, 2003; Rawlins & Praveen, 1993; Shahbaz, Awan, & Ahmad, 2011; Tochitskaya, 2007). Some empirical evidence supports the currency depreciation-trade balance improvement hypotheses in the long run, as well as the J-curve occurrence in shorter time periods (Aftab & Aurangzeb, 2002; Baharumshah, 2001; Bahmani-Oskooee, 2001; Brahmasrene & Jiranyakul, 2002; Lal & Lowinger, 2002; Onafowora, 2003; Rincón-Castro, 1999; Stucka, 2004; Stučka, 2003; Tochitskaya, 2007).

In contrast to the previous argument, some studies have tested the weak empirical impact of CD on long-run TB and J-curve significance in the short run (Buluswar, Thompson, & Upadhyaya, 1996; Duasa, 2007; Mahdavi & Sohrabian, 1993; Narayan, 2004; Wilson, 2001; Wilson & Tat, 2001). There is also evidence that CD has negatively impacted trade balances in Greece, India, Korea, and Thailand (Bahmani-Oskooee, 1985), eight developing countries in Asia, Europe, Africa, and Latin America (Upadhyaya & Dhakal, 1997), Turkey (Kale, 2001), and Pakistan (Aftab & Khan, 2008; Shahbaz et al., 2011). Halicioglu (2008) found that CD improves Turkish TB in the long-run but has an insignificant short-run J-curve.

Employing the autoregressive distributed lag (ARDL) approach on Ghana's quarterly data from 2000 to 2017 to ascertain both the long-run and short-run relationships, Xin et al. (2020) showed that depreciation increases exports while appreciation increases imports. Thus, CD in Ghana will improve the country's TB. For the cases of Ghana and South Africa, Agbola (2004) and Keshab and Mark (2013) showed that there is no J-curve and that CD has a long-run positive impact on TB. Similarly, Aftab and Aurangzeb (2002) find an ML condition in the long-run and a J-curve in the short-run for Pakistan. Aftab and Khan (2008) and Shahbaz et al. (2011) found no proof for a standard J-phenomenon in Pakistan. Rena, Chani, Irfan, and Shahabz (2011) revealed that there is a long-run relationship among TB, CD, real income, and money supply and that any CD in Papua New Guinea will worsen its TB.

Using the trade balance approach, empirical studies have evaluated the effect of currency devaluations and depreciations on the TB and confirmed the existence of the ML condition (Bahmani-Oskooee & Brooks, 1999; Bahmani-Oskooee et al., 2014; Boyd et al., 2001; Onafowora, 2003). Some studies have used the elasticity approach to BOP, in which export and import demand elasticities are separately modeled by two equations. Senhadji and Montenegro (1999) and Wang and Lee (2012) used the elasticity approach to determine the price elasticity of each sector. This method enables the determination of the price elasticity of each sector, making it easier to formulate policies for each sector.

Demirden and Pastine (1995); Hacker and Hatemi-J (2003); and Narayan (2004) have also provided evidence that a J curve exists. However, studies like Bahmani-Oskooee and Ratha (2004), Rose (1991), and Rose and Yellen (1989) found no empirical support for the J curve. Alawattage (2009) examined the effectiveness of Sri Lanka's ER policy in achieving external competitiveness since the liberalization of the economy in 1977 and concluded that the real effective ER has no significant impact on improving the trade balance, particularly in the short run.

Some empirical studies in Pakistan have examined the influence of ERs on TB, explicitly aggregating and disaggregating exports and imports in terms of country, commodity, and industry. In this section, we examine studies that measure aggregated elasticities. The import, export, and balance of trade elasticities of ER, price, and income are displayed in Tables 1–3. They vary according to their sample period, data frequency, empirical methods, and macroeconomic variables that are modeled. The findings of these studies indicate that ERs play no consistent role in determining trade flows. Among the studies that support devaluation are Hasan and Khan (1994); Khan (1999); Bahmani-Oskooee (1998); Aftab and Aurangzeb (2002); Rehman and Afzal (2003); Kemal and Qadir (2005); Baluch and Bukhari (2012); Saeed and Hussain (2013); Bano et al. (2014); Faridi and Kausar (2016); Khan, Azam, and Emirullah (2016); Khan, Khattak, Amjad, and Ashar (2016); and Ishtiaq, Qasim, and Dar (2016). They argued that depreciation would lead to a shift in consumer spending from imports to domestically produced goods. Consequently, the composition of national expenditures changed. Therefore, devaluation seems to be a realistic approach to boosting a nation's TB over time. Alternatively, Akhtar and Malik (2000), Atique and Ahmad (2003), Felipe, McCombie, and Naqvi (2010), Chaudhary and Amin (2012), Shahbaz, Jalil, and Islam (2012), Saleem, Khan, and Zaman (2013), Shah (2014), Khan et al. (2016), Shahzad, Nafees, and Farid (2017), and Yasmeen and Hafeez (2018) argued that the government's deliberate cheapening of its county's currency further worsens the TB.

Except for the empirical analysis of Ishtiaq et al. (2016), the value of real ER elasticity for export demand in Pakistan ranges between -0.80 and -0.30. This indicates that when the ER falls, export demand in Pakistan does not increase significantly. In contrast to the findings of Afzal and Ahmad (2004), Pakistan's trading partners' incomes have a positive influence on its export demand. With the exception of the studies of Khan (1999) and Yasmeen and Hafeez (2018), the range of real ER elasticity for import demand in Pakistan is -0.24 to -0.78. This indicates that the depreciation of the real ER has a negligible effect on import demand. Increasing domestic income would also increase the demand for foreign goods. Consequently, with a real ER elasticity value ranging between -1.51 and -0.02, depreciation will not improve the TB.

Table 1. Pakistan imports demand elasticities.

Author (s), Years	Data period	Yd	RER or REER	NER	PM/PD	PM
Khan (1999)	1983Q1 - 1993Q3	2.13	0.78			
Aftab and Aurangzeb (2002)	1980Q1 - 2000Q4	0.91			-0.87	
Afzal and Ahmad (2004)	1960-2003	3.19		-2.27	-5.26	
Kemal and Qadir (2005)	1981-2003		**-0.52**			
Felipe et al. (2010)	1980-2007	0.91	-0.24			
Baluch and Bukhari (2012)	1971-2009	1.22			-0.53	
Bano et al. (2014)	1980-2010	0.69		-0.53	0.710	
Khan et al. (2016)	1981-2010	1.40	-0.34			
Ishtiaq et al. (2016)	1970Q1-2012Q4	1.22	-0.78			
Khan and Majeed (2018)	1978-2016	2.16			-1.57	
Yasmeen and Hafeez (2018)	1980-2016	1.13	0.23			-0.37

Note: Bold figure represents the insignificant coefficient.
Source: Where Yd is real GDP of Pakistan, Yf is real GDP of USA. RER is real exchange rate, NER is nominal ER, PM is price-level of imports, Pf is foreign price –level, PX is price-level of exports, and PD is domestic price-level.

Table 2. Pakistan export demand elasticities.

Author (s), Years	Data period	Yf	RER or REER	NER	P_x/P_f	P_x
Khan (1999)	1983Q1 - 1993Q3	1.63	-0.32			
Aftab and Aurangzeb (2002)	1980Q1 - 2000Q4	2.11			-0.62	
Atique and Ahmad (2003)	1972-2000	2.93	-0.39			
Afzal and Ahmad (2004)	1960-2003	-3.78		0.04	2.92	
Kemal and Qadir (2005)	1981-2003		-0.66			
Felipe et al. (2010)	1980-2007	1.41	**-0.34**			
Saleem et al. (2013)	1981-2010	1.28	-0.86			
Bano et al. (2014)	1980-2010	0.96	-0.30		0.10	
Khan et al. (2016)	1982-2015	1.11	-0.42		-0.06	
Ishtiaq et al. (2016)	1970Q1-2012Q4	1.73	0.31			
Yasmeen and Hafeez (2018)	1980-2016	2.23	-0.80			-0.44

Note: Bold figure represents the insignificant coefficient.

ER policies cannot correct the persistent trade imbalance due to other factors. These factors include: 1) Pakistan imports mostly capital and intermediate goods. Import demand is inelastic and less responsive to ER policies due to this reliance. 2) Pakistan exports most agricultural goods, which have an inelastic supply. Export demand may be less price-sensitive, and global income and depreciation policies may not affect export volume. 3) Pakistan's exports have low value due to low industrial development and a lack of technology-intensive products.

Table 3. Pakistan balance of trade elasticities.

Author (s), Years	Data period	Yf	Yd	RER or REER
Rehman and Afzal (2003)	1972Q1-2002Q4	2.86	-1.82	-0.89
Chaudhary and Amin (2012)	1980-2008	3.03		-0.31
Shahbaz et al. (2012)	1980Q1-2006Q4			-1.02
Saeed and Hussain (2013)	1985-2010	3.45	-2.42	-0.02
Shah (2014)	1980-2011		-2.34	-1.51
Faridi and Kausar (2016)	1972-2014			-0.09
Khan et al. (2016)	2005Q1-2014Q4	-0.01	-0.97	0.024
Ishtiaq et al. (2016)	1970Q1-2012Q4	1.68		0.92

3. HISTORY OF TRADE REGIMES IN PAKISTAN

Different Pakistani governments have implemented several trade policies over the last 73 years. These trade policies aim to reduce the TD, guarantee the availability of essential goods, and safeguard national priorities. Different ministries and departments are in charge of Pakistan's trade policies, which include exchange control, import licensing, export promotion, and tariff policies.

This study aims to examine the degree of responsiveness of imports and exports to ERs under different trade systems. In flexible ER systems, these elasticities are associated with currency appreciation and depreciation. Consequently, this study will focus on trade policies carried out after the introduction of flexible ERs in 1982. Trade policies after 1982 are separated into three episodes (i.e., the 1980s, 1990s, and 2000s). The data on trade and ER policies comes from Zafar (1997), Bader and Riazuddin (2006), and Hina and Qayyum (2019), as well as various trade policies and FBR yearbooks.

3.1. Trade Policy in the 1980s

The first step in Pakistan's economic liberalization was the adoption of a flexible ER policy. In 1982, the Pakistani rupee was unpegged from the US dollar. Previously, the rupee/dollar ER was pegged, and the 1980s-81 increase in the value of the dollar diminished Pakistan's export competitiveness on the international market. Because market forces determined the ER, the floating ER policy facilitated import liberalization by letting the government remove restrictions without risking BOP problems. In 1986, import restrictions on 122 products were lifted, and a negative list was compiled. In 1987-88 and 1988-89, 124 and 162 products, respectively, were removed from the blacklist. The blacklist included items prohibited for religious or safety motives, luxury goods, and products prohibited to shield specific industries. The government has begun ratification, which replaces quantitative restrictions with tariffs for many imported goods. Quantitative restrictions remained the most prevalent form of protection.

3.2. Trade Policy in the 1990s

During this time period, the nation experienced extreme political instability with frequent government changes. The liberalization of trade continued despite the pressure from various donors and international financial institutions. In the late 1980s and 1990s, decentralization and deregulation of state-owned enterprises and national financial institutions, liberal export and export policies, private sector participation in domestic markets and import and export businesses, market distortions, agricultural input subsidies (fertilizers, insecticides, agricultural machinery, etc.), and easing foreign investment restrictions were favored. Due to the country's economic situation, the private sector was allowed to export rice, raw cotton, fruits, and vegetables. Fresh fruit, vegetables, cut flowers, and seafood exporters received a 25% freight subsidy and duty limitation opportunity. The Export Financing Schedule was restructured and expanded. This schedule included Basmati rice, fruits, vegetables, animal casings, and mushrooms among its edible components. In July 1993, licensing requirements for non-negative list imports were eliminated. Pakistan's central government's dependence on customs revenue prevented it from meeting this goal and reducing its budget deficit. The tariff structure was further modified to comply with World Trade Organization (WTO) 1995 regulations. In 1995-96, the maximum tariffs were set at 65%, significantly higher than the initial target of 45%, and remained unchanged in 1996-97. Pakistan decreased the number of prohibited import categories from 215 in 1990 to 68 in 1996 (Ul-Haq, Khanum, & Raza Cheema, 2020; Ul-Haq, Wajid, Visas, Cheema, & Abbas, 2022; Wu, Ul-Haq, Zafar, Sun, & Jiang, 2019).

Dry ports, export processing zones, and new industrial zones were created. Despite this, the government kept setting support prices for a number of agricultural products that were not subject to market forces. Between 1991 and 1998, the value of the Pakistani rupee fell four times. The first episode happened in July 1993, followed by episodes two through four in October 1995, October 1997, and June 1998.

When the Indian government opted to devalue the rupee in May 1993, Indian textile exports soared by 30.2% in rupee terms and 19.5% in dollar terms, triggering the first devaluation in Pakistan. In order to maintain price parity with Indian goods, Pakistani textile exporters desired a minimum 10% currency devaluation. This depreciation had an immediate impact on the price of gasoline. From Rs. 11.31 per liter to Rs. 14.40 per liter, the price increased by 27.32%. The government then used the 14% devaluation of India's currency to support a second devaluation. The government asserted that if Pakistan does not adopt the same strategy, it will lose out on international markets. By making exports more affordable and competitive, devaluation would also increase export volume and foreign exchange transaction revenue. As Pakistan had consistently imported more than it exported, the government was once again unable to reach its objectives. Several exporters asserted that a 25% to 30% increase in import prices could encourage smuggling.

The third devaluation was due to the fact that Pakistan's exports to Europe fell by about 10%, to Japan by 20%, and to Southeast Asian countries by 55%. Pakistan's exports fell due to the rupee's appreciation against the European and Japanese currencies as a result of its being pegged to the dollar.

The government's main reason for a fourth devaluation was that a nuclear test on May 28th hurt the economy as foreign accounts were suspended, which eroded public trust in the government. This devaluation harmed capital goods, industrial raw materials, and military equipment imports.

3.3. Trade Policy during 2000- 2019

Since 2000, trade policy has prioritized trade openness and industrial growth. The government eliminated the five-year restriction on machinery imports, lowered the maximum tariff rate to 25%, and created a Pakistan export finance guarantee agency to help private sector small and medium enterprises (SMEs). The government gradually reduced tariffs on intermediate inputs and raw material imports by lowering the top rate. At the request of international financial institutions, tariff reforms were initiated in the early 1990s (Ul-Haq, Ashraf, Cheema, Hye, & Visas, 2023; Ul-Haq et al., 2020; Ul-Haq et al., 2022; Wu et al., 2019). The total number of tariff slabs decreased over time; in the 1980s, there were 42, but in 1993, there were 10, in 2015, there were 6, in 2016, and in 2017, there were 4. The average tariff rate decreased from 65% in 1989-90 to 45% in 1997-98, 17 percent in 2002-03, and 15% in 2015-2016. The Trade Policy for 2006-07 altered several import regulations, such as allowing government agencies to import directly without consulting the Ministry of Commerce.

To boost exports, Pakistan eliminated tariffs on several products in 2007-08. Manufacturing tariffs were eliminated. Chicken and stainless-steel welded pipes were taxed to protect domestic producers from foreign competition. Strategic protection and competitive import substitution guided the 2019–24 National Tariff Policy (NTP). Strategic protection will reduce business costs in the early stages of the industry's development and be phased out to encourage competition. NTP 2019-24 encouraged cost-effective import substitution. The NTP simplified tariff slabs and gradually reduced tariffs on raw materials, intermediate goods, and machinery to eliminate tariff discrepancies. A cascading tariff structure, where duties increase with product processing, was also implemented.

In July 2000, Pakistan experienced a policy change in the exchange rate (ER) system. This change intensified ER volatility, and the PKR depreciated from Rs. 57.5 to Rs. 60.9 per US dollar. The nominal ER (measured against the US dollar) increased by 6% between 2001 and 2003, while foreign exchange reserves increased by 398%, from $2,146 million to $10,693 million. This was partly due to worker remittances made through official banking channels. To manage liquidity, the SBP purchased $8.3 billion in foreign currency. The global financial crisis of 2007–2008 had a negative impact on Pakistan's economy, affecting capital inflows, trade gaps, and remittances. The Pakistani rupee lost 14% of its value against the U.S. dollar in 2008, moving from Rs. 68.28 to Rs. 78.03 per US dollar. To increase its foreign exchange reserves, the elected government borrowed heavily from international financial institutions and friendly countries, resulting in a 7% appreciation of the rupee in 2014. As a result of the International Monetary Fund's (IMF) market-based ER mechanism, which limited state bank participation, there was a massive depreciation in 2018 and 2019.

This study estimates trade elasticities for three distinct trade regimes on the basis of the information given above: the restricted trade regime of the 1980s, the moderate trade regime where trade liberalisation begins in the 1990s, and the outstandingly liberalised trade regime of the 2000s. Trade regimes are determined by the maximum tariff rate, the simple average tariff rate of all products, and a number of slabs. The information is displayed in Table 4.

Table 4. Trade regimes and the exchange rate regimes.

Period	Top tariff rate	Simple average rate (%)	Slabs	Trade regime	Exchange rate regime
The 1980s	120	65	42	Restricted	The flexible but managed regime
The 1990s	90	47	10	Process of liberalization starts	The flexible but managed regime
The 2000s	30	18	5	Liberalized	Flexible regime

4. THEORETICAL FRAMEWORK

Import and export demand functions analyze how devaluation affects trade deficits and surpluses. It is well known that changes in real disposable incomes at home (Yd) and the real exchange rate affect goods volume (RER). The Cobb-Douglas functional form for the import demand function is given as:

$$IM = A_1\, RER^{\alpha_1} Y_d^{\alpha_2} e^u \quad (1)$$

Taking logarithmic transformation to linearize Equation 1 as follows:

$$Ln\, IM_t = lnA_1 + \alpha_1\, ln\, RER_t + \alpha_2\, ln\, Yd_t + u \quad (2)$$

Where α_1 and α_2 represent the ER and income elasticities, respectively. The expectation is that currency depreciation will reduce import demand (i.e., $\alpha_1 < 0$) while an increase in domestic income will increase the demand for imported products (i.e.,$\alpha_2 > 0$.)

Correlating changes in export volume to variations in foreign income (Yf) and the real ER is a common method for estimating export demand. The export demand function is formulated in the following Cobb- Douglas functional form:

$$EX = A_2 RER^{\beta_1} Y_f^{\beta_2} e^v \quad (3)$$

Taking logarithmic transformation to linearize Equation 3 as

$$Ln\, EX_t = lnA_2 + \beta_1\, ln\, RER_t + \beta_2\, ln\, Yf_t + v \quad (4)$$

In Equations 3 and 4, the elasticities of the ER and income are denoted by the β_1 and β_2 respectively. As the value of a country's currency falls, its exports should rise (i.e., $\beta_1 > 0$), and as foreign income rises, the demand for domestic exports should rise, therefore, $\beta_2 > 0$.

Analyzing the Marshall-Lerner (ML) condition helps determine if the real depreciation improves the trade deficit balance or makes it worse. According to the ML condition, a depreciation improves the trade balance if the total export and import elasticities is greater than one. Additionally, it has been discovered that even when the conditions are met in the long run, for most countries, the PEX and import demand are inelastic in the short run; this may be one of the factors explaining the J-curve.

Estimating the effect of the real ER on the trade balance is typically done by regressing the TB on the RER, the real income of the trading partner country, and the real income of the importing country; that is,

$$LnTB_t = lnA_3 + \gamma_1 \ln RER_t + \gamma_2 \ln Yf_t + \gamma_3 \ln Yd_t + \varepsilon \quad (5)$$

Where γ_1, γ_2 and γ_3 are the ER and income elasticities. Currency depreciation is expected to improve the trade balance, so we expect γ_1 to be positive. We also expect γ_2 to have a positive and γ_3 to have a negative if the trade balance improves as a result of an increase in foreign income and a decrease in domestic income, respectively.

5. ECONOMETRIC METHODOLOGY

To avoid spurious analysis, the long-run elasticities are estimated using a cointegration method. If all variables are integrated in the same order, the Johansen and Juselius (1992) cointegration analysis method is preferable. An alternative choice for explanatory variables is the bound test that Pesaran, Shin, and Smith (2001) developed based on the ARDL model. These approaches are ineffective in addressing the structural break. Therefore, in the presence of a structural break in the series, Johansen and Juselius (1990) use structural break cointegration.

5.1. Cointegration Approach with Structural Breaks

The cointegrated vector autoregressive model with no breaks under Johansen's specification is presented as follows:

$$\Delta z_t = \Pi z_{t-1} + \mu + \sum_{i=1}^{k-1} \Gamma_i \Delta z_{t-i} + \varepsilon_t \quad (6)$$

Where Z_t is a $(k \times 1)$ dimension vector of $I(1)$ variables, μ is a deterministic component, $\varepsilon_t \overset{ii}{\sim} N(0, \Sigma)$ is $(k \times 1)$ a vector of normally distributed random error terms and i is the lag length. $\Gamma_i = -(I - A_1 - \dots\dots\dots - A_i)$ is short-run dynamic coefficients, while $\Pi = -(I - A_1 - \dots\dots\dots - A_l)$ is a $(k \times k)$ matrix describing equilibrium cointegration vectors in the long run.

The rank of the matrix determines the number of cointegrating vectors (r) Π. If $0 < rank(\Pi) < k-1$ then, it is further decomposed into two matrices: i.e. $\Pi = \alpha\beta'$, with α representing a $(k \times r)$ matrix containing the error correction coefficients measuring the speed of adjustment to equilibrium, and β' is a $(r \times k)$ matrix of $r(\Pi)$ cointegrating vectors. The rank of Π (a matrix in Johansen and Juselius (1990) cointegration methodology) is measured by the likelihood ratio trace and maximum eigenvalue statistics. The cointegration relationship among the variables occurs only when 0 < rank Π < k.

The deterministic part μ plays an essential role in cointegration analysis. It consists of $\mu_1, \Pi_1 t$ constant and trend terms in the long-run cointegration equation and $\mu_2, \delta_2 t$ are drift and trend of short-run vector autoregressive (VAR) model. According to the deterministic components, five distinct specifications along critical values have been discussed (Johansen, 1995). If the series have a quadratic trend, then reduced rank involves the combine matrix $(\Pi, \Pi_1) = \alpha(\beta', \gamma')'$ of the following, in Equation 7, cointegrated VAR model.

$$\Delta z_t = \Pi z_{t-1} + \Pi_1 t + \mu_1 + \sum_{i=1}^{k-1} \Gamma_i \Delta z_{t-i} + \varepsilon_t \quad (7)$$

The sample is divided at each structural break point if there are q number of structural breakdowns. The VAR(p) model, in Equation 8, is picked for each sub-sample such that:

$$\Delta z_t = \Pi z_{t-1} + \Pi_j t + \mu_{1j} + \sum_{i=1}^{k-1} \Gamma_i \Delta z_{t-i} + \varepsilon_t \quad (8)$$

The parameters of the stochastic components, i.e., Π, Γ_i, and Σ are the same for all sub-samples, whereas the parameters of deterministic trend Π_j and μ_{1j} may change between sub-samples. A cointegration hypothesis is then formulated based on the rank of either Π alone or in combination with $\Pi_1, \ldots, \Pi_q$. That is;

$$H_l(r): rank\left(\Pi, \Pi_1, \ldots, \Pi_q\right) \leq r \quad \text{or} \quad \left(\Pi, \Pi_1, \ldots, \Pi_q\right) = \alpha \begin{pmatrix} \beta \\ \gamma_1 \\ \vdots \\ \gamma_q \end{pmatrix}'$$

When there is no linear trend, but there is a broken constant level, a related hypothesis arises.

$$H_c(r): rank\left(\Pi, \mu_1, \ldots, \mu_q\right) \leq r \quad \text{and} \quad \left(\Pi, \Pi_1, \ldots, \Pi_q\right) = 0$$

In the presence of a structural break, the trace test's asymptotic distribution changes. The break location ($\lambda = T_b/T$) and (k - r), where k is the number of variables and r is the cointegrating rank being tested. Estimation is performed on JMulti and Eviews Software.

5.2. Vector Error Correction Model (VECM)

In this study, we employed a VECM. As no explicit a priori functional form relation between the variables is required, the VECM is helpful as it eliminates errors in model specification. When a shock or innovation occurs, a VECM and the cointegration equation allow dynamic adjustment in the short run as all variables revert to their long-run values. A compacted version of the VECM is presented as follows:

$$\begin{bmatrix} \Delta IM_t \\ \Delta RER_t \\ \Delta Y_{d_t} \end{bmatrix} = \begin{bmatrix} a \\ b \\ c \end{bmatrix} \left[\begin{bmatrix} 1 & \beta_1 & \beta_2 \end{bmatrix} \begin{bmatrix} IM_t \\ RER_t \\ Y_t \end{bmatrix} + \begin{bmatrix} \lambda & 1 \end{bmatrix} \begin{bmatrix} D1998_{t-1} \\ c \end{bmatrix} \right] + \begin{bmatrix} \varphi_1 & \varphi_2 & \varphi_3 \\ \phi_1 & \phi_2 & \phi_3 \\ \psi_1 & \psi_2 & \psi_3 \end{bmatrix} \begin{bmatrix} \Delta IM_{t-1} \\ \Delta RER_{t-1} \\ \Delta Y_{d_{t-1}} \end{bmatrix}$$

The associated t – values are given as

$$\begin{bmatrix} \Delta IM_t \\ \Delta RER_t \\ \Delta Y_{d_t} \end{bmatrix} = \begin{bmatrix} a \\ b \\ c \end{bmatrix} \left[\begin{bmatrix} \cdots & t_{\beta_1} & t_{\beta_2} \end{bmatrix} \begin{bmatrix} IM_t \\ RER_t \\ Y_{d_t} \end{bmatrix} + \begin{bmatrix} t_\lambda & t_0 \end{bmatrix} \begin{bmatrix} D1998_{t-1} \\ c \end{bmatrix} \right] + \begin{bmatrix} t_{\varphi_1} & t_{\varphi_2} & t_{\varphi_3} \\ t_{\phi_1} & t_{\phi_2} & t_{\phi_3} \\ t_{\psi_1} & t_{\psi_2} & t_{\psi_3} \end{bmatrix} \begin{bmatrix} \Delta IM_{t-1} \\ \Delta RER_{t-1} \\ \Delta Y_{d_{t-1}} \end{bmatrix}$$

5.3. Data and Construction of Variables

This study used annual data from 1982 to 2019. The data are obtained from International Financial Statistics (IFS). Table 5 provides a detailed description and measurements of the variables.

Figure 1 shows nominal and real PKR/USD ERs. Depreciating nominal and real ERs raises NER and RER. Both lines moved the same way from 1980–2001. After 2001, NER and RER diverged as the SBP fixed the ER during crises. Domestic prices outpace foreign prices, offsetting NER depreciation. RER rose despite nominal depreciation. Only in extreme short-term disorders should the SBP fix the ER with reserves. Currency crises or attacks occur if the SBP uses reserves to maintain the ER against the market.[1].

As illustrated in Figure 2, the flawed ER policy has also impacted Pakistan's trade balance. While Pakistan had a small deficit trade balance as a developing country, as ER policy became more anti-market, imports began to rise while exports remained stagnant, resulting in a broadening deficit TB. Imports rose faster than exports and remained above exports.

[1] For more details, see Ul-Haq and Hina (2020).

Table 5. Description of variables.

Variables	Description	Measure	Source
IM	Real imports measured in billion Rs.	The nominal import value is deflated by the domestic price index of imports (2010=100)	IFS
EX	Real exports measured in billion Rs.	The nominal export value is deflated by the domestic price index of exports (2010=100)	IFS
TB	Trade Balance	It is the difference between real exports and real imports divided by real gross domestic product (GDP) to control scale effects. The figures are transformed by adding 1 minus the minimum value for log transformation to avoid logs with null values.	IFS
Yd	Real GDP of Pakistan	The GDP deflator deflates the nominal GDP to obtain the real GDP	IFS
Yf	The real GDP of the USA is used as a proxy for foreign countries income	The nominal GDP of the US is deflated by its GDP deflator to obtain the real GDP of a foreign country	IFS
RER	Real exchange rate	$(RER = \frac{NER * P_f}{P_d})$ Where NER is the nominal ER of Pakistan rupee (PKR) per unit of US dollar (US $), Pf and Pd are the price levels in a domestic and foreign country measured by using CPI of the respective countries.	IFS

Note: Pd is domestic price level, whereas Pf stands for foreign price level.

All series follow a random walk model with drift, and each series has a break between 1998 and 2000.

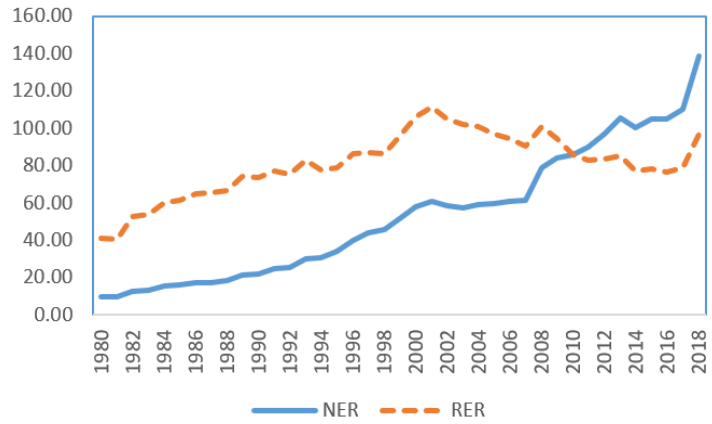

Figure 1. Nominal and real exchange rates in Pakistan.

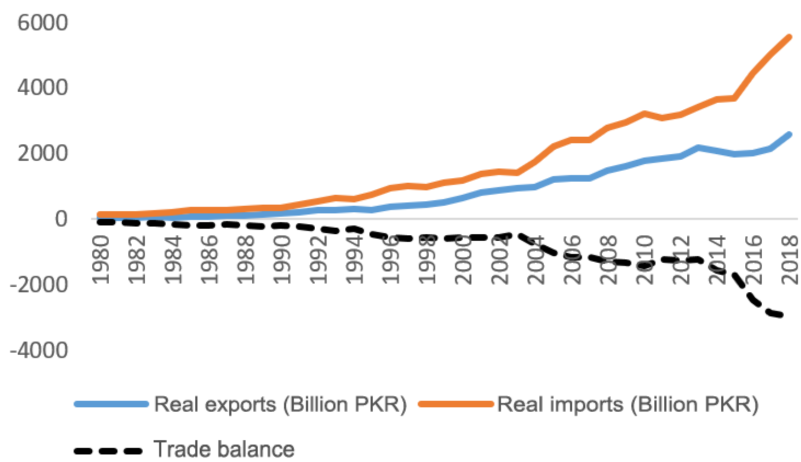

Figure 2. Imports, exports and trade balance.

6. EMPIRICAL RESULTS

In order to estimate elasticities, the regression model applies a logarithmic transformation to all variables denoted by lowercase letters. Cointegration analysis focused on determining each series' order of integration. The existence of a unit root is tested using statistics from the augmented Dickey and Fuller (1981) (ADF) and Zivot and Andrews (2002) tests. The unit root test compares the null hypothesis of unit root against the break-stationary alternative hypothesis and chooses the break period endogenously. Tables 6a and 6b show the results of the ADF and Zivot and Andrews (2002) unit root tests. Both tests recommend that all variables are stationary at the first difference, and each series breaks around 1998.

Table 6a. Unit root test at level of series.

Variables	Lags	ADF test statistic	Zivot and andrews test		Order of integration
			Test statistics	Break	
IM	0	-1.90	-3.78	1995	I(1)
EX	0	-0.86	-3.55	2001	I(1)
Yd	0	-2.17	-4.16	2000	I(1)
Yf	1	-1.23	-1.23	2003	I(1)
RER	0	-2.36	-3.53	1999	I(1)
TB	2	-2.20	-3.73	2001	I(1)

Table 6b. Unit root test at first difference of series.

Variables	Lags	ADF test statistic	Zivot and andrews test		Order of integration
			Test statistics	Break	
ΔIM	0	-6.575***	-6.542***	1995	I(0)
ΔEX	0	-7.312***	-9.359***	2001	I(0)
ΔYd	0	-6.537***	-8.113***	2000	I(0)
ΔYf	0	-4.086***	-4.863***	2001	I(0)
ΔRER	0	-3.001***	-3.517***	1999	I(0)
ΔTB	1	-8.073***	-8.722***	1999	I(0)

Note: *** denotes 1% significance level.

The structural break cointegration method that Johansen et al. (2000) came up with is a good way to estimate both the long-term and short-term relationships between the variables. While we did establish two structural breaks in 1998 and 2000, the latter initially appeared to be very insignificant. Breakpoint 1998 dummy variables are thus introduced as:

$D_{1998,t} = 0$ ($t = 1982$, ..., 1998); $= 1$ ($t = 1999$, ..., 2019) and $D_{1998,t-k}$ will be introduced in VECM.

7. ESTIMATES OF TRADE ELASTICITIES

To begin, we present the long- and short-run estimates of the import-export demand function for the entire sample, covering the years 1982 through 2019, and then we present the appropriate elasticities.

7.1. Results of the Import Demand Function

As shown in Equation 2, real imports (lnIM), real ER (lnRER), and real domestic income (lnYd) are the three variables that determine both the long-run and short-run elasticity of the import demand function. According to the AIC, SIC, HQ, and FPE information criteria, one period is the optimal lag time for the VAR model. At the 5% significance level, the VAR (1) residual shows heteroscedasticity and the absence of serial correlation.

In the cointegration and VAR parts of the vector error correction model (VECM), it is important to deal with random parts like drift and trend terms. This must be done after the lag length of the VAR model has been set. The majority of our series exhibit linear trends. The intercept component is freely added in cointegration analysis in both the long-run (cointegration portion) and short-run (VAR) models, according to Hina and Qayyum (2015). The trace statistic is shown in Table 7 after being adjusted by the ratio $\frac{T-K_1}{T}$ to account for the bias caused by the limited sample size.

Table 7. Johansen *et al.*, (2000) cointegration test results.

Null hypothesis	Alternative hypothesis	$H_c(r)$	0.05 Critical value ($\lambda = 0.5, q = 2$)		
			90%	95%	99%
r = 0	r > 0	111.468[a]	36.990	12.850	42.850
r ≤ 1	r > 1	24.913	21.930	26.440	27.170
r ≤ 2	r > 2	7.672	11.050	43.460	16.690

Note: 'a' Indicates the rejection of the null hypothesis.

The null hypothesis of no cointegration (r=0) is rejected by the trace test at the 5% level, but the null hypothesis of a single cointegrating vector is not. As a result, the import demand function is cointegrated with one cointegrating vector. The result of the VECM is shown as:

$$\begin{bmatrix}\Delta im_t\\ \Delta rer_t\\ \Delta\, y_{d_t}\end{bmatrix} = \begin{bmatrix}0.073\\ 0.051\\ 0.170\end{bmatrix}\left[\begin{bmatrix}1 & -0.465 & -2.210\end{bmatrix}\begin{bmatrix}im_t\\ rer_t\\ y_{d_t}\end{bmatrix} + \begin{bmatrix}0.701 & 4.813\end{bmatrix}\begin{bmatrix}D1998_{t-1}\\ c\end{bmatrix}\right]$$

$$+\begin{bmatrix}0.035 & -0.045 & 1.072\\ -0.210 & 0.042 & 0.450\\ -0.042 & 0.101 & -1.922\end{bmatrix}\begin{bmatrix}\Delta im_{t-1}\\ \Delta rer_{t-1}\\ \Delta\, y_{d_{t-1}}\end{bmatrix}$$

The associated t – values are given as:

$$\begin{bmatrix}\Delta im_t\\ \Delta rer_t\\ \Delta\, y_{d_t}\end{bmatrix} = \begin{bmatrix}1.101\\ 0.847\\ 9.063\end{bmatrix}\left[\begin{bmatrix}\ldots & -3.140 & -23.631\end{bmatrix}\begin{bmatrix}im_t\\ rer_t\\ y_{d_t}\end{bmatrix} + \begin{bmatrix}6.613 & 7.348\end{bmatrix}\begin{bmatrix}D1998_{t-1}\\ c\end{bmatrix}\right]$$

$$+\begin{bmatrix}0.231 & -0.223 & 2.632\\ -1.520 & 0.231 & 1.349\\ -0.8987 & 1.506 & -1.703\end{bmatrix}\begin{bmatrix}\Delta im_{t-1}\\ \Delta rer_{t-1}\\ \Delta\, y_{d_{t-1}}\end{bmatrix}$$

The residual of VECM satisfied the diagnostic tests of Breusch-Godfrey LM test (Proposed by Breusch (1978) and Godfrey (1978)) of no serial correlation with one lag ($\chi^2 = 2.012,\ p - value = 0.158$), Engle (1982) no autocorrelation conditional heteroskedasticity (ARCH) LM test with one lag ($\chi^2 = 0.101,\ p - value = 0.760$) and Jarque-Bera normality test ($\chi^2(2) = 0.971,\ p - value = 0.623$) at 5% level of significance.

From the above representation the long run estimates for import demand function is:

$$im_t = -4.813 - 0.701 D1998_{t-1} + 0.465 rer_t + 2.210\, y_{d_t}$$

(7.363) (6.612) (3.143) (23.630)

Contrary to theoretical expectations, the results indicate that a one percent depreciation of the real ER increases real imports by 0.47 percent over the long term. However, depreciation has little effect on import demand in the short term. A percentage increase in domestic income increases import demand significantly over the long and short terms. These findings align with those of Khan (1999) and Yasmeen and Hafeez (2018). The import market is insensitive to changes in the real ER. Pakistan's primary import are machinery and petroleum products, which are considered essential manufacturing inputs. Inelastic import demand indicates that no progress has been made in developing energy-saving technologies and that the country is still highly dependent on imported energy.

7.2. Results of the Export Demand Function

Equation 4 specifies the export demand function in terms of the three underlying variables: real exports (lnEX), real ER (lnRER), and real foreign income (lnYf). In the case of the VAR model, the Akaike information criterion

(AIC), Hannan-Quinn information criterion (HQ), and final prediction error (FPE) all recommend a lag of two periods, while the Schwarz information criterion (SIC) recommends a lag of only one period. The residual of the VAR (2) passes the diagnostic tests for no serial correlation and no heteroscedasticity at the 5% level, but not the residual of the VAR (1). Therefore, lag two is considered an optimal lag length.

For cointegration analysis, we introduce the unrestricted intercept terms and the D_{1998} dummy variable in both the long-run (cointegrating part) and short-run (VAR) models. The trace statistic is provided in Table 8 after adjustment by a factor (T-kl)/T to correct for small sample bias.

Table 8. Johansen et al. (2000) cointegration test results.

Null hypothesis	Alternative hypothesis	$H_c(r)$	0.05 Critical value ($\lambda = 0.5, q = 2$)		
			90%	95%	99%
r = 0	r > 0	89.554[a]	36.990	12.850	42.850
r ≤ 1	r > 1	23.210	21.930	26.440	27.170
r ≤ 2	r > 2	8.643	11.050	43.460	16.690

Note: 'a' indicates the rejection of the null hypothesis.

The trace test shows one cointegrating vector among the variables of export demand function at a 5% level of significance. The result of VECM for export demand function is presented as below.

$$\begin{bmatrix}\Delta ex_t\\ \Delta rer_t\\ \Delta y_{f_t}\end{bmatrix} = \begin{bmatrix}-0.070\\ -0.013\\ -0.017\end{bmatrix}\left[\begin{bmatrix}1 & -1.392 & -1.411\end{bmatrix}\begin{bmatrix}ex_t\\ rer_t\\ y_{f_t}\end{bmatrix} + \begin{bmatrix}0.130 & 4.241\end{bmatrix}\begin{bmatrix}D1998_{t-1}\\ c\end{bmatrix}\right]$$

$$+\begin{bmatrix}-0.255 & 0.532 & -1.783\\ -0.153 & 0.077 & 1.375\\ -0.019 & -0.021 & 0.251\end{bmatrix}\begin{bmatrix}\Delta ex_{t-1}\\ \Delta rer_{t-1}\\ \Delta y_{f_{t-1}}\end{bmatrix} + \begin{bmatrix}0.100 & -0.359 & -1.211\\ -0.201 & 0.231 & -0.405\\ -0.033 & 0.033 & -0.279\end{bmatrix}\begin{bmatrix}\Delta ex_{t-2}\\ \Delta rer_{t-2}\\ \Delta y_{f_{t-2}}\end{bmatrix}$$

The associated t – values are given as

$$\begin{bmatrix}\Delta ex_t\\ \Delta rer_t\\ \Delta y_{f_t}\end{bmatrix} = \begin{bmatrix}-3.390\\ -0.777\\ -4.902\end{bmatrix}\left[\begin{bmatrix}\ldots & -1.280 & -1.214\end{bmatrix}\begin{bmatrix}ex_t\\ rer_t\\ y_{f_t}\end{bmatrix} + \begin{bmatrix}0.262 & 0.887\end{bmatrix}\begin{bmatrix}D1998_{t-1}\\ c\end{bmatrix}\right]$$

$$+\begin{bmatrix}-1.812 & 2.562 & -2.101\\ -1.339 & 0.483 & 2.162\\ -1.051 & -0.600 & 1.854\end{bmatrix}\begin{bmatrix}\Delta ex_{t-1}\\ \Delta rer_{t-1}\\ \Delta y_{f_{t-1}}\end{bmatrix} + \begin{bmatrix}0.751 & -1.633 & 1.379\\ -2.023 & 1.370 & -0.634\\ -1.267 & 0.967 & -2.000\end{bmatrix}\begin{bmatrix}\Delta ex_{t-2}\\ \Delta rer_{t-2}\\ \Delta y_{f_{t-2}}\end{bmatrix}$$

The residual of VECM satisfies the diagnostic tests of Breusch-Godfrey LM test of no serial correlation with one lag ($\chi^2 = 0.313\ p - value = 0.579$), Engle (1982) no autocorrelation conditional heteroskedasticity (ARCH) LM test with one lag ($\chi^2 = 0.557,\ p - value = 0.460$), and Jarque-Bera normality test ($\chi^2(2) = 3.777,\ p - value = 0.147$) at 5% level of significance.

The long run estimates for the export demand function derived from the above compact representation are presented as follows:

$$EX_t = -4.241 - 0.130D1998_{t-1} + 1.392RER_t + 1.411Yf_t$$

(0.891) (0.257) (1.283) (1.210)

Similar to the findings of Felipe et al. (2010), the results indicate that a 1% depreciation of the real ER increases export demand by 0.53 percent in the short-run but has no effect on export demand in the long-run. In contrast, a one percent increase in foreign income reduces export demand by 1.78 percent in the short run but has no effect on export demand in the long-run. This indicates that Pakistan continues to export goods under its own brand names. A lot of our staple foodstuffs, including basmati rice, are shipped overseas under foreign labelling. Products benefit from brand loyalty on the global market. The following sections, which examine the effect of a depreciating currency and rising foreign and domestic incomes on the TB, further corroborate the accuracy of this result.

7.3. Results of the Trade Balance

To investigate the impact of real ER on trade balance, as shown in Equation 5, the AIC, SIC, HQ, and FPE information criteria suggest an optimal lag length of one for the VAR model. The residual of the VAR (1) satisfies the prerequisites of no serial correlation and no heteroscedasticity at a 5% level of significance. For cointegration analysis, we introduce the unrestricted intercept terms in both the long run (cointegrating part) and short-run (VAR) models, along with the D_{1998} dummy variable. The trace statistic is provided in Table 9 after adjustment by a factor (T-kl)/T to correct for small sample bias.

Table 9. Johansen et al. (2000) cointegration test results.

Null hypothesis	Alternative hypothesis	$H_c(r)$	0.05 Critical value ($\lambda = 0.5, q = 2$)		
			90%	95%	99%
r = 0	r > 0	146.770[a]	55.980	58.240	62.660
r ≤ 1	r > 1	39.782 [a]	36.990	38.960	42.850
r ≤ 2	r > 2	23.207	21.930	23.670	27.170
r ≤ 3	r >3	7.832	11.050	12.840	16.690

Note: 'a' indicates the rejection of the null hypothesis.

The trace test shows two cointegrating vectors among the variables of the TB model at a 5% level of significance. The result of VECM is reported below.

$$\begin{bmatrix} \Delta tb_t \\ \Delta rer_t \\ \Delta y_{f_t} \\ \Delta y_{d_t} \end{bmatrix} = \begin{bmatrix} -0.081 \\ -0.970 \\ 2.832 \\ 0.201 \end{bmatrix} \left[[1 \quad 0.087 \quad -0.054 \quad 0.281] \begin{bmatrix} tb_t \\ rer_t \\ y_{f_t} \\ y_{d_t} \end{bmatrix} + [-0.030 \quad -0.364] \begin{bmatrix} D1998_{t-1} \\ c \end{bmatrix} \right]$$

$$+ \begin{bmatrix} 0.069 & 0.031 & 0.011 & -0.012 \\ 0.962 & 0.067 & 0.042 & 2.212 \\ -2.332 & 0.931 & -0.287 & -0.552 \\ -0.564 & 0.024 & 0.041 & 0.381 \end{bmatrix} \begin{bmatrix} \Delta tb_{t-1} \\ \Delta rer_{t-1} \\ \Delta y_{f_{t-1}} \\ \Delta y_{d_{t-1}} \end{bmatrix}$$

The associated t-values are

$$\begin{bmatrix} \Delta tb_t \\ \Delta rer_t \\ \Delta y_{f_t} \\ \Delta y_{d_t} \end{bmatrix} = \begin{bmatrix} -.172 \\ -2.160 \\ 4.970 \\ 1.940 \end{bmatrix} \left[[\ldots \quad 3.725 \quad -2.230 \quad 2.554] \begin{bmatrix} tb_t \\ rer_t \\ y_{f_t} \\ y_{d_t} \end{bmatrix} + [-2.200 \quad -3.562] \begin{bmatrix} D1998_{t-1} \\ c \end{bmatrix} \right]$$

$$+ \begin{bmatrix} 0.400 & 1.251 & 0.534 & -0.027 \\ 0.932 & 0.421 & 0.387 & 3.341 \\ -1.773 & 4.474 & -2.380 & -0.667 \\ -2.314 & 0.510 & 1.713 & 2.461 \end{bmatrix} \begin{bmatrix} \Delta tb_{t-1} \\ \Delta rer_{t-1} \\ \Delta y_{f_{t-1}} \\ \Delta y_{d_{t-1}} \end{bmatrix}$$

The residual of VECM satisfied the diagnostic tests of Breusch-Godfrey LM test of no serial correlation with one lag ($\chi^2 = 0.310\ p - value = 0.578$), Engle (1982) no autocorrelation conditional heteroskedasticity (ARCH) LM test with one lag ($\chi^2 = 0.55,\ p - value = 0.456$) and Jarque-Bera normality test ($\chi^2(2) = 3.767,\ p - value = 0.150$) at the 5% level of significance.

From the above compact representation, the long run estimates for import demand function are presented below as follows:

$$TB_t = 0.364 + 0.030D1998_{t-1} - 0.087RER_t + 0.054Yf_t - 0.281\ Y_{d_t}$$

(3.56) (2.20) (-3.73) (2.23) (-2.55)

The depreciation of the real ER by 1% reduces the trade balance by 0.09 percent in the long-run but has no significant effect in the short-run. This result confirms our previous findings that depreciation will not reduce import demand or increase export demand in Pakistan in the long run. According to the theory, changes in domestic and foreign income have favorable effects on TB.

As a result, we reject the J-curve phenomenon and conclude that ER policy has no effect on the structure. The need for a devaluation stems from inefficiencies in the structure of the economy.

7.4. Regime-wise Trade Elasticities

We can use the estimated trade elasticities for each trade regime to determine if depreciated ERs improve our trade balance. Table 10 shows that real ER depreciation increases import demand regardless of ER policy. The degree of ER elasticity means that import demand grows more slowly (0.40%) under a floating ER policy with liberalised trade policies than under restricted trade and managed float regimes (0.74%). A trade-restricted system makes import demand more currency-sensitive.

The elasticity of demand for exports is shown Table 11 indicates that currency depreciation does not lead to a rise in export demand. So, relating export promotion to currency depreciation is irrational. In order to make its exports globally competitive, a country should focus on diversifying its exports, adding value to them, and reducing the cost of raw materials through tariff reduction. Other than that, depreciation will only increase the cost of imported raw materials, which will in turn raise the unit price of exported goods. The majority of Pakistan's imports consist of raw materials, and estimates indicate that between 20 and 30 percent of all inputs used in Pakistani manufacturing have actually come from elsewhere (Ali, 2014).

Therefore, a weakening currency would hurt Pakistan's exports rather than help them. Elasticities in the trade balance lend credence to these claims. Table 12 shows that a 0.07 percentage point increase in the trade deficit is attributable to real ER depreciation. So, we can confidently conclude that Marshall Lerner's condition does not apply to Pakistan and that it will continue to be a net importer.

Table 10. Import demand elasticities.

Trade regime	Exchange-rate policy	Data period	Yd	RER
Restricted	Managed float	1980-1989	1.030***	0.740*
The process of liberalization started	Managed float	1990-1999	2.550***	0.500
Liberalized	Flexible	2000-2018	1.770***	0.400*
Complete sample period		1980-2018	2.210***	0.470***

Note: ***, * are the significance level at 1% and 10%.

Table 11. Export demand elasticities.

Trade regime	Exchange-rate policy	Data period	Yf	RER
Restricted	Managed float	1980-1989	3.210***	0.500
The process of liberalization started	Managed float	1990-1999	2.530***	0.760
Liberalized	Flexible	2000-2018	3.190***	-0.560
Complete sample period		1980-2018	1.410	1.390

Note: *** is the significance level at 1%.

Table 12. Balance of trade elasticities.

Trade regime	Exchange-rate policy	Data period	Yd	Yf	RER
Restricted	Managed float	1980-1989	0.120***	-0.120***	-0.070***
The process of liberalization started	Managed float	1990-1999	0.190	-0.240***	-0.070
Liberalized	Flexible	2000-2018	0.020	0.330***	-0.080*
Complete sample period		1980-2018	-0.280***	0.05***	-0.090***

Note: ***,* are the significance level at 1% and 10%.

8. CONCLUSION AND RECOMMENDATIONS

Using Pakistan's different trade regime data from 1982–2019, this study demonstrates that fixing TD through Depreciation is a misguided policy. The study estimates the long-run and short-run relationships between the variables using the Johansen et al. (2000) structural break cointegration technique and the VECM. It also explored the sensitivity of Pakistan's trade elasticities to various trade regimes and ER policies.

Export demand elasticity indicates that export demand is less sensitive to real ER fluctuations. This indicates that Pakistan continues to export goods under the Pakistan brand. For instance, the majority of its primary goods, such as basmati rice, are exported under foreign brand names. Brand loyalty protects goods on the global market, and exporters must be educated about product branding. Import demand is unaffected by real ER changes. Pakistan imports mostly machinery and petroleum, which are production inputs. Pakistan's inability to develop energy-saving technologies and import demand inelasticity show its dependence on imported energy. ER policy does not affect the structure of the economy. Trade-enhancing policies do not cause depreciation; rather, economic inefficiencies and reserve losses do. The government and policymakers should reform the economy rather than let the currency depreciate.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Data Availability Statement: Upon a reasonable request, the supporting data of this study can be provided by the corresponding author.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

Aftab, Z., & Aurangzeb, A. Z. (2002). The long-run and short-run impact of exchange rate devaluation on Pakistan's trade performance. *The Pakistan Development Review, 41*(3), 277-286. https://doi.org/10.30541/v41i3pp.277-286

Aftab, Z., & Khan, S. (2008). *Bilateral j-Curves between Pakistan and her trading partners (No. 2008: 45)*. Pakistan Institute of Development Economics.

Afzal, M., & Ahmad, I. (2004). Estimating long-run trade elasticities in Pakistan: A cointegration approach [with comments]. *The Pakistan Development Review, 43*(4), 757-770. https://doi.org/10.30541/v43i4iipp.757-770

Agbola, F. (2004). *Does devaluation improve trade balance of Ghana.* Paper presented at the The International Conference on Ghana's Economy at the Half Century, M-Plaza Hotel, Accra, Ghana.

Agenor, P.-R. (1991). Output, devaluation and the real exchange rate in developing countries. *Review of World Economics, 127*(1), 18-41. https://doi.org/10.1007/bf02707309

Akhtar, S., & Malik, F. (2000). Pakistan's trade performance vis-a-vis its major trading partners. *The Pakistan Development Review, 39*(1), 37-50. https://doi.org/10.30541/v39i1pp.37-50

Alawattage, U. (2009). Exchange rate, competitiveness and balance of payment performance. *Staff Studies, 35*(1), 1-29. https://doi.org/10.4038/ss.v35i1.1234

Alejandro, C. F. D. (1963). A note on the impact of devaluation and the redistributive effect. *Journal of Political Economy, 71*(6), 577-580. https://doi.org/10.1086/258816

Alexander, S. S. (1952). Effects of a devaluation on a trade balance. *Staff Papers-International Monetary Fund, 2*(2), 263-278.

Ali, A. (2014). Share of imported goods in consumption of Pakistan. *SBP Research Bulletin, 10*(1), 59-61.

Anju, G.-K., & Uma, R. (1999). Is there a J-Curve? A new estimation for Japan. *International Economic Journal, 13*(4), 71-79.

Atique, Z., & Ahmad, M. (2003). he supply and demand for exports of Pakistan: The polynomial distributed lag model (PDL) approach [with Comments]. *The Pakistan Development Review, 42*(4), 961-972. https://doi.org/10.30541/v42i4iipp.961-972

Ayen, Y. W. (2014). The effect of currency devaluation on output: The case of Ethiopian economy. *Journal of Economics and International Finance*, *6*(5), 103-111. https://doi.org/10.5897/jeif2013.0548

Bader, S., & Riazuddin, R. (2006). *Determining import intensity of exports for Pakistan (No. 15)*. State Bank of Pakistan, Research Department.

Baharumshah, A. Z. (2001). The effect of exchange rate on bilateral trade balance: New evidence from Malaysia and Thailand. *Asian Economic Journal*, *15*(3), 291-312. https://doi.org/10.1111/1467-8381.00135

Bahmani-Oskooee, M. (1985). Devaluation and the J-curve: some evidence from LDCs. *The Review of Economics and Statistics*, *67*(3), 500-504. https://doi.org/10.2307/1925980

Bahmani-Oskooee, M. (1998). Cointegration approach to estimate the long-run trade elasticities in LDCs. *International Economic Journal*, *12*(3), 89-96.

Bahmani-Oskooee, M. (2001). Nominal and real effective exchange rates of Middle Eastern countries and their trade performance. *Applied Economics*, *33*(1), 103-111. https://doi.org/10.1080/00036840122490

Bahmani-Oskooee, M., & Brooks, T. J. (1999). Bilateral J-Curve between US and her trading partners. *Weltwirtschaftliches Archiv*, *135*(1), 156-165. https://doi.org/10.1007/bf02708163

Bahmani-Oskooee, M., & Gelan, A. (2012). Is there J-Curve effect in Africa? *International Review of Applied Economics*, *26*(1), 73-81. https://doi.org/10.1080/02692171.2011.619972

Bahmani-Oskooee, M., Harvey, H., & Hegerty, S. W. (2014). Brazil–US commodity trade and the J-Curve. *Applied Economics*, *46*(1), 1-13. https://doi.org/10.1080/00036846.2013.824548

Bahmani-Oskooee, M., & Kandil, M. E. (2007). *Exchange rate fluctuations and output in oil-producing countries: The case of Iran*. IMF Working Papers, No. 2007(113).

Bahmani-Oskooee, M., & Kutan, A. M. (2009). The J-Curve in the emerging economies of Eastern Europe. *Applied Economics*, *41*(20), 2523-2532. https://doi.org/10.1080/00036840701235696

Bahmani-Oskooee, M., & Malixi, M. (1992). More evidence on the J-Curve from LDCs. *Journal of Policy Modeling*, *14*(5), 641-653. https://doi.org/10.1016/0161-8938(92)90034-a

Bahmani-Oskooee, M., & Ratha, A. (2004). The J-Curve: A literature review. *Applied Economics*, *36*(13), 1377-1398. https://doi.org/10.1080/0003684042000201794

Bahmani-Oskooee, M., & Zhang, R. (2013). The J-Curve: Evidence from commodity trade between UK and China. *Applied Economics*, *45*(31), 4369-4378. https://doi.org/10.1080/00036846.2013.783680

Balassa, B., Voloudakis, E., Fylaktos, P., & Suh, S. T. (1989). The determinants of export supply and export demand in two developing countries: Greece and Korea. *International Economic Journal*, *3*(1), 1-16.

Baluch, K. A., & Bukhari, S. K. H. (2012). *Price and income elasticity of imports: The case of Pakistan No. 48*. State Bank of Pakistan, Research Department.

Bano, S. S., Raashid, M., & Rasool, S. A. (2014). Estimation of Marshall Lerner condition in the economy of Pakistan. *Stud*, *3*(4), 1-20.

Bernanke, B. (2005). *The global saving glut and the US current account deficit (No. 77)*. Board of Governors of the Federal Reserve System (US).

Blanchard, O., & Milesi-Ferretti, G. M. (2012). (Why) should current account balances be reduced? *IMF Economic Review*, *60*(1), 139-150. https://doi.org/10.1057/imfer.2012.2

Boyd, D., Caporale, G. M., & Smith, R. (2001). Real exchange rate effects on the balance of trade: Cointegration and the Marshall–Lerner condition. *International Journal of Finance & Economics*, *6*(3), 187-200. https://doi.org/10.1002/ijfe.157

Brahmasrene, T., & Jiranyakul, K. (2002). Exploring real exchange rate effects on trade balances in Thailand. *Managerial Finance*, *28*(11), 16-27. https://doi.org/10.1108/03074350210768130

Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. *Australian Economic Papers*, *17*(31), 334-355. https://doi.org/10.1111/j.1467-8454.1978.tb00635.x

Buluswar, M. D., Thompson, H., & Upadhyaya, K. P. (1996). Devaluation and the trade balance in India: Stationarity and cointegration. *Applied Economics, 28*(4), 429-432. https://doi.org/10.1080/000368496328551

Chaudhary, M. A., & Amin, B. (2012). Impact of trade openness on exports growth, imports growth and trade balance of Pakistan. *Forman Journal of Economic Studies, 8*(1), 63-81.

Chong, L.-L., & Tan, H.-B. (2008). Exchange rate risk and macroeconomic fundamentals: Evidence from four neighbouring southeast Asian economies. *International Research Journal of Finance and Economics, 16*(1), 88-95. https://doi.org/10.1108/10867370710831828

Demirden, T., & Pastine, I. (1995). Flexible exchange rates and the J-Curve: An alternative approach. *Economics Letters, 48*(3-4), 373-377. https://doi.org/10.1016/0165-1765(94)00634-e

Dickey, D., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*(4), 1057-1072. https://doi.org/10.2307/1912517

Duasa, J. (2007). Determinants of Malaysian trade balance: An ARDL bound testing approach. *Global Economic Review, 36*(1), 89-102.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica, 50*(4), 987–1007. https://doi.org/10.2307/1912773

Faridi, M. Z., & Kausar, R. (2016). Exploring the existence of J-Curve in Pakistan: An empirical analysis. *Pakistan Journal of Social Sciences, 36*(1), 551-561.

Felipe, J., McCombie, J. S., & Naqvi, K. (2010). Is Pakistan's growth rate balance-of-payments constrained? Policies and implications for development and growth. *Oxford Development Studies, 38*(4), 477-496. https://doi.org/10.1080/13600818.2010.525351

Frenkel, R. (2004). *Real exchange rate and employment in Argentina*. Brazil, Chile and Mexico: Group of, 24.

Galebotswe, O., & Andrias, T. (2011). Are devaluations contractionary in small import-dependent economies? Evidence from Botswana. *Botswana Journal of Economics, 8*(12), 86-98.

Godfrey, L. G. (1978). Testing for higher order serial correlation in regression equations when the regressors include lagged dependent variables. *Econometrica: Journal of the Econometric Society, 46*(6), 1303-1310. https://doi.org/10.2307/1913830

Goldstein, M., & Khan, M. (1978). The supply and demand for exports: A simultaneous approach. *The Review of Economics and Statistics, 60*(2), 275-286. https://doi.org/10.2307/1924981

Hacker, R. S., & Hatemi-J, A. (2003). Is the J-curve effect observable for small North European economies? *Open Economies Review, 14*(2), 119-134.

Halicioglu, F. (2008). The bilateral J-Curve: Turkey versus her 13 trading partners. *Journal of Asian Economics, 19*(3), 236-243. https://doi.org/10.1016/j.asieco.2008.02.006

Hasan, M. A., & Khan, A. H. (1994). Impact of devaluation on Pakistan's external trade: An econometric approach. *The Pakistan Development Review, 33*(4), 1205-1215. https://doi.org/10.30541/v33i4iipp.1205-1215

Hina, H., & Qayyum, A. (2015). Re-estimation of Keynesian model by considering critical events and multiple cointegrating vectors. *The Pakistan Development Review, 54*(2), 123-145. https://doi.org/10.30541/v54i2pp.123-145

Hina, H., & Qayyum, A. (2019). Effect of financial crisis on sustainable growth: Empirical evidence from Pakistan. *Journal of the Asia Pacific Economy, 24*(1), 143-164. https://doi.org/10.1080/13547860.2019.1573453

Ishtiaq, N., Qasim, H., & Dar, A. (2016). Testing the Marshall-Lerner condition and the J-Curve phenomenon for Pakistan: Some new insights. *International Journal of Economics and Empirical Research, 4*(6), 307-319.

Iyoboyi, M., & Muftau, O. (2014). Impact of exchange rate depreciation on the balance of payments: Empirical evidence from Nigeria. *Cogent Economics & Finance, 2*(1), 923323.

Jin, G. (2008). The impact of oil price shock and exchange rate volatility on economic growth: A comparative analysis for Russia Japan and China. *Research Journal of International Studies, 8*(1), 98-111.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration--with applications to the demand for money. *Oxford Bulletin of Economics and Statistics, 52*(2), 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Johansen, S., & Juselius, K. (1992). Testing structural hypotheses in a multivariate cointegration analysis of the PPP and the UIP for UK. *Journal of Econometrics, 53*(1-3), 211-244. https://doi.org/10.1016/0304-4076(92)90086-7

Johansen, S., Mosconi, R., & Nielsen, B. (2000). Cointegration analysis in the presence of structural breaks in the deterministic trend. *The Econometrics Journal, 3*(2), 216-249. https://doi.org/10.1111/1368-423x.00047

Johansen, S. r. (1995). The role of ancillarity in inference for non-stationary variables. *The Economic Journal, 105*(429), 302-320. https://doi.org/10.2307/2235492

Kale, P. (2001). Turkey's trade balance in the short and the long run: Error correction modeling and cointegration. *The International Trade Journal, 15*(1), 27-56. https://doi.org/10.1080/088539001300005440

Kandil, M. (2004). Exchange rate fluctuations and economic activity in developing countries: Theory and evidence. *Journal of Economic Development, 29*(1), 85-108.

Kemal, M. A., & Qadir, U. (2005). Real exchange rate, exports, and imports movements: A trivariate analysis. *The Pakistan Development Review, 44*(2), 177-195.

Keshab, R. B., & Mark, A. (2013). The effects of exchange rate on the trade balance in Ghana: Evidence from co-integration analysis *African Journal of Business Management, 7*(14), 1126-1143.

Khan, F. N., & Majeed, M. T. (2018). Modelling and forecasting import demand for Pakistan: An empirical investigation. *The Pakistan Journal of Social Issue, 10*, 50-64.

Khan, S., Azam, M., & Emirullah, C. (2016). Import demand income elasticity and growth rate in Pakistan: The impact of trade liberalization. *Foreign Trade Review, 51*(3), 201-212. https://doi.org/10.1177/0015732516646208

Khan, S. R. (1999). Devaluation and the balance of trade do world bank and IMF policies work? In (pp. 32-47). London: Palgrave Macmillan UK.

Khan, S. U., Khattak, S. W., Amjad, A., & Ashar, H. (2016). Empirical analysis of aggregate export demand of Pakistan. *Journal of Global Innovations in Agricultural and Social Sciences, 4*(1), 50-55.

Krugman, P., & Taylor, L. (1978). Contractionary effects of devaluation. *Journal of International Economics, 8*(3), 445-456. https://doi.org/10.1016/0022-1996(78)90007-7

Lal, A. K., & Lowinger, T. C. (2002). The J-Curve: Evidence from East Asia. *Journal of Economic Integration, 17*(2), 397-415. https://doi.org/10.11130/jei.2002.17.2.397

Mahdavi, S., & Sohrabian, A. (1993). The exchange value of the dollar and the US trade balance: An empirical investigation based on cointegradon and Granger causality tests. *The Quarterly Review of Economics and Finance, 33*(4), 343-358. https://doi.org/10.1016/1062-9769(93)90003-3

Miles, M. A. (1979). The effects of devaluation on the trade balance and the balance of payments: Some new results. *Journal of Political Economy, 87*(3), 600-620. https://doi.org/10.1086/260780

Mordi, C. N. (2006). Challenges of exchange rate volatility in economic management in Nigeria. *Bullion, 30*(3), 3.

Musawa, N. (2014). Relationship between Zambias exchange rates and the trade balance-J-Curve hypothesis. *International Journal of Finance and Accounting, 3*(3), 192-196.

Musila, J. W., & Newark, J. (2003). Does currency devaluation improve the trade balance in the long run? Evidence from Malawi. *African Development Review, 15*(2-3), 339-352. https://doi.org/10.1111/j.1467-8268.2003.00076.x

Narayan, P. K. (2004). New Zealand's trade balance: Evidence of the J-Curve and granger causality. *Applied Economics Letters, 11*(6), 351-354. https://doi.org/10.1080/1350485042000228187

Onafowora, O. (2003). Exchange rate and trade balance in East Asia: Is there a J-Curve. *Economics Bulletin, 5*(18), 1-13.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326. https://doi.org/10.1002/jae.616

Rahman, M., & Islam, A. M. (2006). Taka-Dollar exchange rate and Bangladesh trade balance: Evidence on J-Curve or S-Curve? *Indian Journal of Economics and Business, 5*(2), 279.

Rawlins, G., & Praveen, J. (1993). *Devaluation and the trade balance: The recent experience of selected African countries: Center for economic research on Africa, department of economics and finance*. New Jerse: Montclair State University.

Rehman, H. U., & Afzal, M. (2003). The J curve phenomenon: An evidence from Pakistan. *Pakistan Economic and Social Review, 41*(1-2), 45-58.

Reis Gomes, F. A., & Senne Paz, L. (2005). Can real exchange rate devaluation improve the trade balance? The 1990–1998 Brazilian case. *Applied Economics Letters, 12*(9), 525-528. https://doi.org/10.1080/13504850500076908

Rena, R., Chani, D., Irfan, M., & Shahabz, M. (2011). Impact of currency depreciation on trade balance: A case study on papua new guinea. *Journal of Pacific Studies, 31*(1), 117-140.

Rincón-Castro, H. (1999). *Testing the short-and-long-run exchange rate effects on trade balance: The case of Colombia*. Drafts of Economics; No. 120.

Rose, A. K. (1991). The role of exchange rates in a popular model of international trade: Does the 'Marshall–Lerner'condition hold? *Journal of International Economics, 30*(3-4), 301-316. https://doi.org/10.1016/0022-1996(91)90024-z

Rose, A. K., & Yellen, J. L. (1989). Is there a J-Curve? *Journal of Monetary Economics, 24*(1), 53-68.

Saeed, M. B., & Hussain, I. (2013). Real exchange rate and trade balance of Pakistan: An empirical analysis. *Jinnah Business Review, 1*(1), 44-51. https://doi.org/10.53369/otup9269

Saleem, K., Khan, S. A., & Zaman, K. (2013). Pakistan's export demand income and price elasticity estimates: Reconsidering the evidence. *Research Journal of Recent Sciences, 2*(5), 59-62.

Senhadji, A. S., & Montenegro, C. E. (1999). Time series analysis of export demand equations: A cross-country analysis. *IMF Staff Papers, 46*(3), 259-273.

Shah, A., & Majeed, M. T. (2014). *Real exchange rate and trade balance in Pakistan: An ARDL co-integration approach (No. 57674)*. University Library of Munich, Germany.

Shahbaz, M., Awan, R. U., & Ahmad, K. (2011). The exchange value of the Pakistan rupee & Pakistan trade balance: An ARDL bounds testing approach. *The Journal of Developing Areas, 44*(2), 69-93. https://doi.org/10.1353/jda.0.0108

Shahbaz, M., Jalil, A., & Islam, F. (2012). Real exchange rate changes and the trade balance: The evidence from Pakistan. *The International Trade Journal, 26*(2), 139-153. https://doi.org/10.1080/08853908.2012.657588

Shahzad, A. A., Nafees, B., & Farid, N. (2017). Marshall-Lerner condition for South Asia: A panel study analysis. *Pakistan Journal of Commerce and Social Sciences, 11*(2), 559-575.

Soleymani, A., Chua, S. Y., & Saboori, B. (2011). The J-Curve at industry level: Evidence from Malaysia-China trade. *International Journal of Economics and Finance, 3*(6), 66-78. https://doi.org/10.5539/ijef.v3n6p66

Stucka, T. (2004). *The effects of exchange rate change on the trade balance in Croatia (No. 4-65)*. Washington: International Monetary Fund.

Stučka, T. (2003). *The impact of exchange rate changes on the trade balance in Croatia (No. 11)*. The Croatian National Bank, Croatia.

Tochitskaya, I. (2007). The effect of exchange rate changes on belarus's trade balance. *Problems of Economic Transition, 50*(7), 46-65. https://doi.org/10.2753/pet1061-1991500704

Ul-Haq, J., Ashraf, I., Cheema, A. R., Hye, Q. M. A., & Visas, H. (2023). The relationship between trade liberalization and gender disparity in education: Evidence from Pakistan. *Nurture, 17*(3), 180-193. https://doi.org/10.55951/nurture.v17i3.291

Ul-Haq, J., Khanum, S., & Raza Cheema, A. (2020). The impact of trade liberalization on child labor in Pakistan. *International Review of Applied Economics, 34*(6), 769-784. https://doi.org/10.1080/02692171.2020.1782853

Ul-Haq, J., Wajid, F., Visas, H., Cheema, A. R., & Abbas, S. (2022). The nexus between trade liberalization and poverty: A disaggregated analysis. *Asian Economic and Financial Review, 279-295*(4), 279-295.

Ul-Haq, N., & Hina, H. (2020). *Pakistan's five currency crisis. PIDE's Knowledge Brief No. 7*. Retrieved from https://pide.org.pk/research/pakistans-five-currency-crises/

Upadhyaya, K. P., & Dhakal, D. (1997). Devaluation and the trade balance: Estimating the long run effect. *Applied Economics Letters, 4*(6), 343-345. https://doi.org/10.1080/135048597355276

Wang, Y.-H., & Lee, J.-D. (2012). Estimating the import demand function for China. *Economic Modelling, 29*(6), 2591-2596. https://doi.org/10.1016/j.econmod.2012.08.002

Wilson, P. (2001). Exchange rates and the trade balance for dynamic Asian economies—does the J-Curve exist for Singapore, Malaysia, and Korea? *Open Economies Review, 12*(4), 389-413.

Wilson, P., & Tat, K. C. (2001). Exchange rates and the trade balance: The case of Singapore 1970 to 1996. *Journal of Asian Economics, 12*(1), 47-63. https://doi.org/10.1016/s1049-0078(01)00072-0

Wu, M., Ul-Haq, J., Zafar, N. U., Sun, H., & Jiang, J. (2019). Trade liberalization and informality nexus: Evidence from Pakistan. *The Journal of International Trade & Economic Development, 28*(6), 732-754. https://doi.org/10.1080/09638199.2019.1593489

Xin, W., Chibsah, R., & Garti, E. (2020). Exchange rate depreciation and balance of trade in developing countries: Evidence from Ghana. *Journal of Applied Economic Sciences, 15*(3), 1-7.

Yasmeen, R., & Hafeez, M. (2018). Trade balance and terms of trade relationship: Evidence from Pakistan. *Pakistan Journal of Applied Economics, 28*(2), 173-188.

Yazici, M. (2006). Is the J-Curve effect observable in Turkish agricultural sector? *Journal of Central European Agriculture, 7*(2), 319-322.

Zafar, M. (1997). *Export promotion and its diversification through trade policy reforms*. Islamabad: Pakistan Institute of Development Economics.

Zivot, E., & Andrews, D. W. K. (2002). Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. *Journal of Business & Economic Statistics, 20*(1), 25-44. https://doi.org/10.1198/073500102753410372