THE NEXUS BETWEEN TRADE LIBERALIZATION AND POVERTY: A DISAGGREGATED ANALYSIS

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ABSTRACT

Decades after trade liberalization, poverty among the developing countries has continued to rise as their economies adjust to fierce and increasing external competition. This study investigates the impact of the 1988 trade reforms on poverty in Pakistan using micro-level data from 1990 to 2005. Using the feasible generalized least squares (FGLS) model in panel setting to address the problem of heteroskedasticity, we explored the impact of trade liberalization on the poverty level in Pakistan. The findings reveal that reductions in import tariffs have increased Pakistan's level of poverty. Our findings are robust and impervious to different poverty measures (i.e., headcount ratio, poverty gap, and squared poverty gap). Also, it was observed that lagged trade policies are associated with poverty in Pakistan. The rise in poverty may be attributed to the lower participation of the poor in external markets. It is recommended that policymakers enact policies that will encourage poor people to participate in external markets if they wish to benefit from trade liberalization.

Contribution/Originality: The major contribution to the existing literature on the trade-poverty nexus is that it employed regional tariffs approach of Topalova (2010) to construct the provincial level trade liberalization index, which is a better proxy for regional trade studies.

1. INTRODUCTION

Most of today's emerging countries substantially reduced tariff and non-tariff barriers during the 1980s and early 1990s, thus liberalizing their economies to foreign competition. It was believed that trade liberalization would increase the growth and efficiency of most developing countries, though a number of them were concerned that trade liberalization may increase the disparity among low- and high-income groups and hence increase poverty (Goldberg & Pavcnik, 2003; Wu, Jabbar, Naeem, Huaping, & Jingyu, 2019). The impact of trade liberalization on poverty is inconclusive in existing literature (Castilho, Marta, & Aude, 2012; McCaig, 2011; Niimi, Puja, & Alan, 2007; Topalova, 2010; Winters, McCulloch, & McKay, 2004).

According to the Heckscher–Ohlin model, the benefits from trade should move toward the intensively used factors. This means that in developing nations the semi-skilled labor force would acquire more benefits from trade (Castilho et al., 2012; Davis, 1996; Feenstra & Gordon, 1997). However, the Heckscher–Ohlin model's predictions

have been refuted by existing literature on various Latin American countries, where deflated income distribution and a growing skill premium appeared during the periods of trade liberalization (Castilho et al., 2012; Goldberg & Nina, 2004; Hanson, 2004). Existing empirical studies suggest that we should use the spectrum of Heckscher–Ohlin's model to determine the impact of trade liberalization on the distribution of income and poverty (Castilho et al., 2012; Harrison, John, & Margaret, 2010). Existing literature also advocates that trade liberalization is linked with rising vulnerability and suggests that the poor entity of society does not always benefit from trade reforms. As far as the short run is concerned, trade liberalization leads to bigger stress on different actors of the economy, while in the long term, even a flourishing trade liberalization regime may leave some people below the poverty line (Santos-Paulino, 2017; Winters, 2002).

The relationship between trade liberalization and poverty may differ from country to country and from region to region (Rodriguez & Rodrik, 2000; Santos-Paulino, 2017; Winters et al., 2004). Few empirical studies that have attempted to relate trade openness and poverty have provided conflicting results. The results depend upon the methodology adopted in the study. For example, Torres-Reyna (2007) applied a regional approach in India and discovered that trade openness adopted between 1987 and 1997 increased poverty and had a significant influence on inequality in rural districts. The study also pointed out that trade openness had no considerable impact on poverty and inequality in urban Indian districts. McCaig (2011) also found a reduction in poverty in provinces that are more exposed to tariff reduction in a study of the short-term effects on Vietnam's provinces. Castilho et al. (2012) observed that trade liberalization leads to an increase in poverty and income inequality in urban areas and reduces inequality and poverty in rural areas. Besides these studies, others also produced inconclusive results. Mixed findings in the existing literature regarding the connection between trade liberalization and poverty necessitate further analysis to understand the issue in Pakistan.

Our study found a strong association between trade liberalization and poverty. It revealed that reductions in the protection rate led to an increase in poverty in Pakistan. All of the measures used by Foster, Greer, & Thorbecke (1984) (henceforth FGT)[1] – headcount ratio (henceforth HCR), poverty gap (henceforth PG), and squared poverty gap (henceforth SPG) – demonstrate that the link between trade liberalization and poverty is negative in all models. Our results are consistent with those of Castilho et al. (2012); Heo & Doanh (2009); and Topalova (2007) and contrast those of McCaig (2011); Niimi, Puja, & Alan (2003); Santos-Paulino (2017).

This study adds to the literature specifically in the case of Pakistan in the following ways: First, this study uses a cutback in the protection rates as a proxy for trade liberalization, which is a better proxy than the trade ratio used in existing studies on Pakistan.[2] Second, province-level panel data was used to deal with the existing mixed results of the impact of trade liberalization on poverty as opposed to prior studies that used time series data for estimation purposes. Third, the 1990–2005 time period was used for analysis, which corresponds to Pakistan's actual liberalization period. And finally, our study uses all FGT measures for analysis.

The rest of the paper is arranged as follows: Section 2 discusses trade theories and the theoretical channels of trade poverty linkage, Section 3 gives details on empirical studies, Section 4 presents information on the datasets used, Section 5 explains the methodology and empirical framework, Section 6 presents the results, and Section 7 presents the conclusion and policy recommendations.

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[1] As there is inconclusive evidence about the impact of trade liberalization on poverty, it is suggested that all FGT measures of poverty are used instead of the commonly used HCR in existing literature. The analysis of poverty should not be restricted to only one measure of poverty as each index of the FGT family of poverty has its own advantages and disadvantages: (1) HCR is the most widely used and easiest measure of poverty. It shows the number of poor among the whole population that are below the poverty threshold. It does not meet the monotonicity and transfer axiom of poverty; (2) PG is another measure of poverty. It calculates the gap between poor people and the poverty line. PG satisfies the monotonic axiom but it violates the transferability axiom; (3) SPG tells us to what extent poverty affects the population and measures the severity of poverty. It satisfies both the monotonicity and transfer axiom of poverty.

[2] For details, see Khan & Bashir (2012) and Batool & Saghir (2020).

2. THEORETICAL FRAMEWORK

Blau, Ferber, & Winkler (1998) argued that economists are likely to hypothesize that individuals tend to be rational while developing theories and formulating models. Lydall (1971) is of the view that discrepancies in brainpower, education, and the environments in which individuals find themselves cause disparities in income distribution. The common explanation of human capital theory is that lower investment by individuals in personal characteristics (i.e., education and others) results in economic backwardness, which further leads to poverty (Hong & Pandey, 2007). In developing countries, consumers with little to no physical or financial assets are considered poor. According to the permanent income hypothesis, the consumptions of individuals depend on lifetime resources instead of present earnings. If the current income of an individual is higher than their permanent income, he can purchase more financial and physical assets and get out of poverty. On the other hand, if their current income is less than their permanent income, they must borrow to fulfill basic needs. Since debt is a liability to one's assets, it may be attributed to poverty (Patnaik, 1997).

Variations in trade reforms affect the poor directly and indirectly. The structure introduced by McCulloch, Winters, & Cirera (2001) depicts that the variations in trade are passed on to households through three basic channels:

i.   Distribution.
ii. Enterprise.
iii. Government.

2.1. Distribution Channel

Variations in trade affect the poor population directly via distribution channels. This channel considers the prices of tradable products and services. The degree to which variations in prices of products and services influence the poor will rely on several components: worldwide prices, exchange rate, domestic taxes, market integration over time, and transportation and storage costs.

The impact of a price change on the poor depends on whether they are net buyers or sellers of a product or service. A reduction in the price level of a commodity will favor users rather than producers of that commodity, while a rise in the price of a product or service will benefit net producers of that product or service and harms net consumers. The increasing exposure of national markets to foreign price variations and the destruction of associations or national markets that facilitate the fixing of domestic prices depicts that sellers and buyers of a product will be more sensitive to foreign price fluctuations (Winters et al., 2004). This phenomenon will affect the welfare of poor households and they will react to this by taking actions to minimize the risk. For example, the rising vulnerability of the poor due to price fluctuations may persuade the poor farmers to produce suboptimal yields to minimize uncertainty.

2.2. Enterprise Channel

Enterprise is also one of the main channels through which trade liberalization affects the welfare of poor households. This channel consists of profits, earnings, and employment. For example, trade liberalization causes a reduction in the prices of imported commodities, which typically pulls down the demand and price of domestic commodities and further anticipates the domestic price of an import-competing product to move downward. This reduction in domestic price will decrease the demand for labor and, therefore, a contraction in wages or employment is observed, usually in the short run thus increasing poverty. Contrarily, low priced imported goods increase the effectiveness of other commodities, including exported commodities, because the imports are used in the production process in the domestic market, which expands the production of exported goods, and this may expand the demand for low-skilled laborers, which covers a large proportion of the population in developing countries. This scenario will move wages and employment upward, thus reducing poverty while increasing the welfare of poor households (Turner, Nguyen, & Bird, 2008).

2.3. Government Channel

Trade liberalization also impacts the welfare of poor households through taxes and transfers. Tariffs are a source of revenue for the government and the revenue can be spent on the welfare of the poor. A change in tariffs alters the pattern of government spending on economic and social welfare projects (e.g., education, health, sanitation, infrastructure, and social protection). The government may have to face more or less revenue because of variations in foreign trade reform. It is worth mentioning here that trade amendments can affect the state's revenue only slightly and less frequently than commonly conceptualized (Winters et al., 2004).

The capability of the transmission structure among trade openness and its impact on the welfare of the poor households will be determined by the poor people's supply response. The efficiency of households and poor individuals to accommodate trade openness and respond to opportunities will rely on different factors including where they live; the intra-household decision making; the ability of the household to deal with risk, collapse, and susceptibility; assets of the poor households; and access to these assets and markets.

3. EMPIRICAL STUDIES

This section discusses the literature (both national and international empirical studies) on the association between trade liberalization and poverty. Among the early studies, Topalova (2004) scrutinized the association between district-level poverty and the massive abrupt variations in India's trade reforms during 1987–97. She developed a regional approach to differentiate regional tariffs from sectoral tariffs. Poverty is calculated using the HCR. The results demonstrated that trade liberalization significantly increases poverty in rural India, while urban poverty also rises but insignificantly. Dollar & Kraay (2004) ascertained several developing countries that have experienced large tariff cuts and extensions in trade volumes in the 1980s and 1990s. Trade ratios and income share of poor quintiles were adopted for the measurement of trade liberalization and poverty, respectively. The study demonstrated that trade liberalization is good for the growth of an economy. It is also pointed out that there is no significant association between variations in trade ratios and changes in the distribution of income within countries. Therefore, the study concluded that if trade openness contributes to enhancing economic growth, this will increase the incomes of the poor population.

Goldberg & Pavcnik (2007) inspected the impact of trade liberalization on poverty in Colombia's urban regions using micro level data for 1986, 1988, 1990, 1992, 1994, 1996, and 1998. HCR and import tariffs were utilized for the assessment of the nexus between poverty and trade liberalization. The empirical findings suggest that liberalization significantly reduced poverty in Colombia. Barraud & Calfat (2008) analyzed the nexus between trade liberalization and poverty in Argentina using microdata from 1993 to 2003. Tariffs were used to estimate trade liberalization, while poverty was measured with all FGT (i.e., HCR, PG, and SPG) measures. The results suggested that a cutback in tariffs is correlated with a reduction in poverty irrespective of the poverty measure adopted.

Moreover, Heo & Doanh (2009) explored the link between trade liberalization and poverty in Vietnam from 1993 to 2004. Trade ratios ((export + import)/GDP) were used for the measurement of trade liberalization, while poverty was measured by the incidence and depth of poverty. The findings reported that unrestricted trade led to a reduction in poverty in Vietnam. Castilho et al. (2012) examined the impact of trade liberalization on poverty and income inequality by examining the microdata of Brazilian states from 1987 to 2005. To measure poverty, FGT measures were adopted, whereas income inequality was measured by the Gini coefficient and the Theil index. Trade liberalization was measured using the Liberalization (LIB) indicator, which was constructed by following Topalova (2010). Results suggest that unrestricted trade causes a rise in poverty and inequality in urban localities and a reduction of the same in rural areas.

Furthermore, McCaig (2011) investigated the link between trade and poverty in Vietnam based on Bilateral Trade Agreements (BTA) employing data from the 2002 and 2004 Vietnam Household Living Standards Surveys (VHLSS). Poverty was measured using HCR. Provincial indices of the United States tariffs were constructed to

investigate the impact of bilateral trade agreements. This study adopted the methodology of Topalova (2010). The results suggested that the provinces that are more exposed to the United States tariff reductions happened to have a reduction in poverty between 2002 and 2004. Bergh & Nilsson (2014) examined the association between globalization and the absolute poverty estimates of the World Bank by employing data from 114 countries during the period from 1983 to 2007. This study used the Konjunkturforschungsstelle (KOF) index for the measurement of globalization, which is updated every year. The HCR is the most preferred index of absolute poverty used in this study. They found that globalization is negatively and significantly associated with poverty. In other words, liberalization of trade is insensitively correlated with a reduction in poverty. Ozcan & Kar (2016) analyzed the effect of liberalization on poverty in Turkey between 1970 and 2010. Trade liberalization was measured by trade ratio, while HCR was used for poverty measurement. The empirical findings showed that trade openness reduced poverty in Turkey.

Onakoya, Johnson, & Ogundajo (2019) determined the association between trade liberalization and poverty in 21 African states from 2005 to 2014. Trade ratio was employed for the measurement of trade liberalization, and the Human Development Index (HDI) was used as a proxy for the determination of poverty. The findings of empirical work show that trade liberalization reduces poverty significantly. Li, Islam, & Fatema (2017) explored the impact of trade openness on poverty and income inequality in developing countries using the period between 1986 and 2013 for analysis. This study used openness of trade and trade facilitation as indexes of trade policy. Poverty was measured through the HCR and poverty gap (PG), whereas income inequality was estimated using the Gini coefficient. The results indicated that trade openness and trade facilitation diminish poverty in underdeveloped nations and lead to a boost in income differences in these economies.

Akmal, Ahmad, Ahmad, & Butt (2007) examined the relationship between trade openness and poverty in the case of Pakistan using time series data for the period 1972-2003. HCR and trade volume are used for poverty and trade openness respectively. Trade liberalization contributed to reducing poverty in the long term but not in the short term in the case of Pakistan. Chaudhry & Imran (2013) investigated the impact of trade liberalization poverty and income inequality in Pakistan from 1980 to 2010. The HCR, Gini coefficient, and trade ratios were adopted for the estimation of poverty, inequality, and trade openness, respectively. Empirical evidence shows that trade liberalization insignificantly reduces poverty. Batool & Saghir (2013b) studied the impact of trade liberalization on poverty in Pakistan using time series data from 1973 to 2012. They employed the HCR for poverty, and trade ratios for trade openness. The empirical results determined that there is a positive connection between trade liberalization and poverty. From the existing empirical studies, it is evident that several different proxies were used for the measurement of trade liberalization. Topalova (2004); Goldberg & Pavcnik (2007); Topalova (2007); Barraud & Calfat (2008); Castilho et al. (2012) and McCaig (2011) used import tariffs for the measurement of trade liberalization. Dollar & Kraay (2004); Heo & Doanh (2009); Ozcan & Kar (2016); Onakoya et al. (2019); Chaudhry & Imran (2013); Batool & Saghir (2013b) and Li et al. (2017) used volume of trade for the measurement of trade liberalization. The findings of prior empirical studies concerning the association between trade liberalization and poverty are inconclusive. McCaig (2011); Li et al. (2017); Barraud & Calfat (2008) and Goldberg & Pavcnik (2007) found that trade liberalization reduces poverty. Castilho et al. (2012) and Topalova (2007) found that trade liberalization increases poverty. Moreover, literature on Pakistan shows mixed results regarding this relationship. All are time series studies, and they used trade ratios as a proxy for trade openness and HCR for poverty. Our study uses a reduction in import tariffs as measure for trade liberalization and uses all FGT (i.e., HCR, PG and SPG) measures of poverty and province level panel data to address the existing mixed findings in the case of Pakistan.

4. DATA

4.1. Pakistan's Trade Policy

Like other developing countries, Pakistan has been living beyond its means for decades. So, to finance its budget deficit, the country depends on foreign aid and borrowing from many national and international sources.

Consequently, Pakistan experienced a faster reduction in government revenue, and expenditures continued to increase sharply. The discrepancies in revenues and expenditures put Pakistan in severe economic crisis in the 1980s. During the crisis, Pakistan attempted to implement a structural adjustment program (SAP) suggested by the World Bank and the International Monetary Fund (IMF). After the execution of the SAP, Pakistan started liberalizing its trading environment as part of the IMF and World Bank's conditions for the structural adjustment program. In addition to trade liberalization, privatization, liberalization of foreign exchange, opening up of external capital markets, and exchange rate regimes, Pakistan also opened its economy to overseas investors (Kiren & Awan, 2018).

Table 1. Descriptive statistics.

Variables	N.	Mean	SD.	Min.	Max.
PLIB	32	17.91	10.54	4.8635	34.94
HCR	32	21.26	6.15	11.11	33.74
PG	32	3.74	1.26	1.5	6.92
SPG	32	1.02	0.42	0.33	2.16
Gini	32	0.29	0.04	0.22	0.37
Remittances	32	966.93	706.43	50.74	2630.66
Education	32	2.68	0.39	2.00	3.26
Family size	32	7.94	0.78	6.68	10.05
No. of dependents	32	6.13	0.73	5.13	8

Pakistan's trade policy was considerably reformed between 1988–2005. During Zia's era, Pakistan substantially liberalized its trading environment. Substantial changes were made in Pakistan's trade policy as part of the SAP requirement and were enforced in 1988. There were gradual and unexpected cutbacks in tariffs over time and across sectors.[3] Pakistan liberalized its trade by reducing tariff rates, then tariff slabs, and then eliminating non-tariff barriers. Although protection rates declined during the study period (1991–2005), the most radical variations occurred during 1992–1999 (Ul-Haq, 2016; Wu et al., 2019). Figure 1 shows the variations in protection rate during 1988–2015. The average tariff rate reduced from 62% in 1990 to 13% in 2005. In 2007, the average tariff rate slightly increased to approximately 15% and then eventually declined between 2008 and 2015. The summary statistics of all the variables under observation, the variable's code, description, and sources, are reported in Table 1 and Table 1A, respectively.

4.2. Poverty in Pakistan

Poverty alleviation remains the main objective of policymakers, and it has gained more consideration after its inclusion in the Millennium Development Goals (MDGs) and later in the sustainable development goals (SDGs). Several studies have been carried by different authors to estimate poverty and its trends using distinctive techniques. However, there is no straightforward conclusion in the case of Pakistan (Ahmed, 2014). Cheema & Sial (2012) found a rising trend of poverty (HCR) in Pakistan from 1992–93 and 2001–02, with the exception of 1993–94 and 1996–97. Using PG and SPG measures, this trend remained the same.

The report by Bank (2002) portrays poverty trends during the 1990s and found that poverty remained as high at the end of the 1990s as it was at the beginning of the 1990s. Existing studies have concluded that poverty doubled from 1990–91 to 1998–99. The WTO formulated some basic standards of trade liberalism and poverty alleviation. In Pakistan, the Poverty Reduction Strategy was initiated after the SAP. It initiated different policies for the purpose of maintaining the demand and supply of labor, e.g., economic growth restoration and land for poor cultivators (Batool & Saghir, 2013a).

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[3] For a detailed description of sectoral distribution of tariff changes during 1990–2005, see Ul-Haq (2016) and Wu et al. (2019).
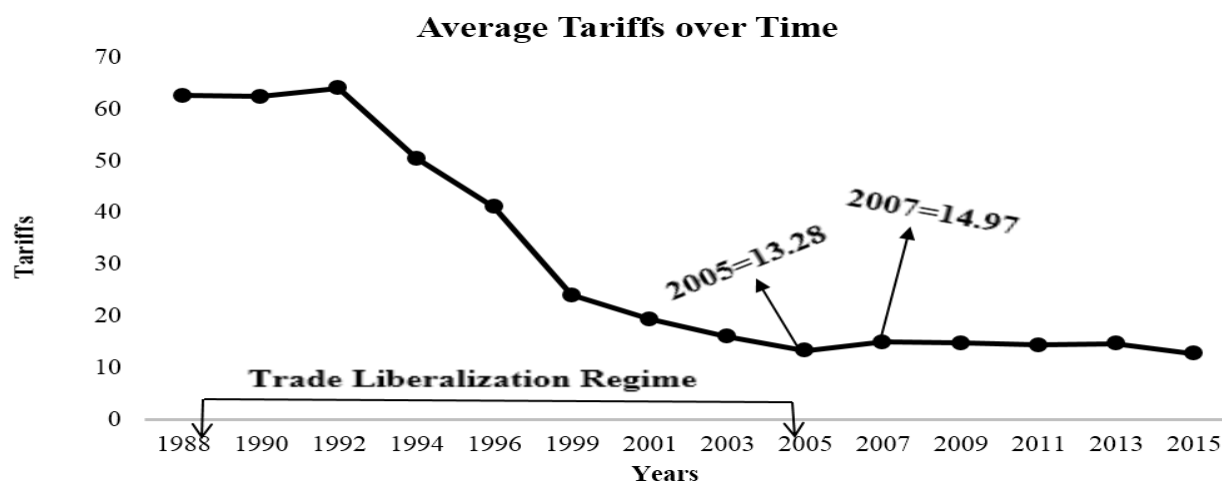
Average Tariffs over Time

Figure 1. Structure of average protection rates in Pakistan.

Table 1A. Definitions of variables.

Variable	Description	Data Source
Trade Liberalization		
PLIB	Trade liberalization refers to the cutback in the protection rates.	Ul-Haq (2016); Wu et al. (2019)
Poverty		
HCR	Headcount ratio is the most widely used and easiest measure of poverty. It shows the number of poor among the whole population that are below the poverty threshold.	Cheema & Sial (2012)
PG	The poverty gap is another measure of poverty that calculates the gap between poor people and the poverty line.	Cheema & Sial (2012)
SPG	The squared poverty gap tells us to what extent poverty affects the population. It satisfies both monotonicity and the transfer axiom of poverty.[4]	Cheema & Sial (2012)
Income Inequality		
Gini	The Gini coefficient is one of the most popular income inequality measures developed by Corrado Gini. It calculates the proportion of the region between the Lorenz curve and diagonal to the total region of the half-square in which this curve lies.[5]	Cheema & Sial (2013)
Remittances		
Remittances per capita	This is defined as the per capita income received from abroad.	HIES (various years)[6]
Education		
Education	This is defined as the average number of years of schooling.	HIES (various years)
Dependency Ratio		
No. of dependents	The dependency ratio refers to the ratio of the number of households to the number of earners.	LFS (various years)
Family Size/Household Size		
Family size	The number of people that make up a whole family unit.	LFS (various years)

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[4] The common formula of FGT measures of poverty is: $FGT_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z-y_i}{z}\right].\alpha$

Where z is the poverty line, y_i is the household's income, n is the number of households, q is the number of poor households, and α is a parameter clarifying the weight given to the distance of households to the poverty threshold. If α = 0, FGT α = HCR; if α = 1, FGT α = PG; and if α = 2, then FGT α = SPG.

[5] Income inequality is computed as: $Gini = \frac{1}{2n^2\bar{Y}}\sum_{i=1}^{n}\sum_{j=1}^{n}|y_i - y_j|.$

The value of the Gini coefficient lies between 0 and 1. A Gini coefficient value that is closer to 0 indicates that there is an equal distribution of income, while a value closer to 1 implies that a high level of income inequality prevails.

[6] The remittance data for 2004 is interpolated because of the non-availability of this data in the HIES for 2004–05.

4.3. National Household Survey

This study uses the national household survey data for 1990–91, 1992–93, 1993–94, 1996–97, 1998–99, 2001–02, 2004–05, and 2005–06. The data are from the Household Income and Expenditure Survey (HIES) and the Pakistan Labor Force Survey (LFS) conducted by the Pakistan Bureau of Statistics. The HIES has been carried out since 1963 with some breaks. The main objective of the HIES is to collect information about household income, consumption, saving, liabilities, and consumption patterns at national and provincial levels and identify the differences between rural and urban areas. The primary objective of the LFS is to gather comprehensive statistics on different aspects of a country's labor force, i.e., the number of people in the labor force, number of unemployed, age, sex, education, marital status, and their share in the total population. The data employed for this study were collected from different sources, and the study sample period is 1990–2005 (i.e., fiscal years 1990–91 to 2005–06).[7] The rationale for selecting this study period is that it corresponds to the pure trade liberalization regime of Pakistan. All available surveys conducted within this time period were considered for the estimation purpose. Import tariffs data were taken from Ul-Haq (2016) and Wu et al. (2019), while poverty data were taken from Cheema & Sial (2012). The HIES and LFS are incorporated to provide data for other control variables for robustness checks.

5. EMPIRICAL FRAMEWORK

To empirically explore the association between trade liberalization and poverty, this study uses a panel regression model.[8] Following Castilho et al. (2012) and McCaig (2011), our study uses the following model specification:

$$\text{Pov}_{pt} = \theta \text{PLIB}_{pt} + \sum_i \beta_i X_{ipt} + \delta_p + \gamma_t + \epsilon_{pt} \tag{1}$$

Where Pov_{pt} denotes poverty in province (p) at time (t), and $PLIB_{pt}$ is the main variable used, which captures the extent of trade liberalization in different regions of Pakistan at time (t). θ is the key parameter of interest, X_{ipt} includes i controls that are supposed to affect poverty and are considered the main determinants of poverty, and δ_p and γ_t are the province and time-specific fixed effects, respectively. The addition of province fixed effects δ_p controls for provincial level time-invariant heterogeneity, whereas the time-specific fixed effect γ_t controls for macroeconomic trends and shocks that may have influenced Pakistan as a whole, and ϵ is the error term.

Following Castilho et al. (2012); Goldberg & Nina (2004); McCaig (2011); Topalova (2007); Ul-Haq (2016); Wu et al. (2019); and Ul-Haq, Khanum, & Raza Cheema (2020), this study uses import tariffs (i.e., policy measure) to measure trade liberalization because it is a better proxy for trade liberalization that overcomes the problem of over-invoicing exports and under-invoicing imports common in developing countries (Bhagwati, 1964; Davis, 2008; Mahmood & Azhar, 2001; Mahmood, 1997; Sheikh, 1974). These problems are normally found in trade ratios ((Trade/GDP) used by Heo & Doanh (2009); Liang (2007); Niimi et al. (2007); and Siddiqui (2012).

Following Edmonds, Pavcnik, & Topalova (2010) and Topalova (2007), this paper built an indicator to capture the impact of trade policy reforms and their variations in different sectors of Pakistan. This indicator is called PLIB; it is the weighted average of industry-level tariffs. The weights correspond to the number of workers employed in each province in various industries as a share of the total workforce in the province in the preliminary year (i.e., 1990) in the present study. PLIB is computed as follows:

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[7] For a detailed explanation of Pakistan's trade policy after the 2005–06 fiscal year, see Pursell, Khan, & Gulzar (2011).

[8] This study used the feasible generalized least squares (FGLS) model in panel setting for final analysis to overcome the problem of heteroskedasticity. As in our dataset, N = 4 and T = 8, so in this situation where T > N, the FGLS proposed by Parks (1967) and Kmenta (1986) is suitable for empirical investigation. As we are concerned with micro data, stationarity is not a problem (Torres-Reyna, 2020).

$$PLIB_{pt} = \frac{\sum_k \left(L_{pk1990} \times Tariff_{kt} \right)}{L_{p1990}}$$

In the above formula, p indicates the entity of analysis (i.e., the province) in this paper, k represents sectors, and t represents time. L_{pk1990} denotes the labor employed in sector k within province p for the year 1990. $Tariff_{kt}$ designates the tariff in sector k at time t, and L_{p1990} stands for the total labor employed province p in 1990.

The province-level tariffs are defined as the industry-level tariffs at time (t) weighted by province-specific employment for the preliminary year. The province-specific employment weights are computed using employment data for the year before trade reform (i.e., 1990) in the case of this study. Edmonds et al. (2010) highlighted that this guarantees that "variations in employment over time resulting from tariff changes do not affect our exposure measure to tariff reforms."

6. RESULTS AND DISCUSSION

The impact of trade liberalization on poverty is initially calculated using Equation 1. Table 2 shows the results of poverty and trade liberalization in Pakistan using PLIB as an indicator of trade liberalization during our estimation period (1990–2005). The coefficients of our main variable of interest (i.e., PLIB) and its corresponding standard errors are also reported in table.

In the below table, poverty is the dependent variable that is measured by HCR, PG, and SPG in columns 1, 2, and 3, respectively. Regarding the link between trade liberalization and poverty, the results in Table 2 show a negative impact of trade liberalization on poverty in Pakistan irrespective of the poverty measure used (HCR, PG, or SPG). It shows that trade liberalization caused an increase in poverty in Pakistan. It also indicates that Pakistan had to face severe poverty during its trade liberalization period. Our results are consistent with those of Castilho et al. (2012); Kis-Katos & Sparrow (2015); Popli (2010); and Topalova (2007) and contrast with those of Bergh & Nilsson (2014); Maertens & Swinnen (2009); Niimi et al. (2003); Santos-Paulino (2017).

Table 2. Trade policy and poverty (FGT Measures)[9] in Pakistan.

Variable	HCR	PG	SPG
PLIB	-2.393***	-0.294**	-0.157*
	(0.546)	(0.137)	(0.091)
Time Indicator	Yes	Yes	Yes
Wald Statistic	30.16	20.08	193.95
P-Value	0.000	0.032	0.000

Note: HCR, PG, and SPG are the dependent variables in the above models. N is 32 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

6.1. Robustness Check

To check the robustness of our findings, we added some control variables in Equation 1 that are believed to be essential determinants of poverty. These control variables perform an imperative role in affecting the levels of poverty. This study uses income inequality, which is regarded as an indispensable determinant of poverty (Castilho et al., 2012), remittances (Mughal & Anwar, 2012), education (Aref, 2011), family size (Harrison & Margaret, 2007; Kamuzora & Mkanta, 2000), and number of dependents (Abrar-ul-haq, Shah, & Ghulam, 2016; Cheema & Sial, 2012)

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[9] In Pakistan, most of the studies applied either one or two measures of poverty and these studies found different results concerning these measures. The mixed results in the existing literature regarding poverty incidence, depth, and severity inspired us to adopt all the FGT measures to see the pure impact of trade liberalization on poverty.

as control variables. Household size and the number of dependents are closely associated and are therefore not used together in any model. Baltagi is of the view that cross-sectional dependence or correlation is not a problem in micro panels (Torres-Reyna, 2020), and is therefore not a problem in this study.

Table 2A. Trade policy and poverty (HCR).

Variable	(1)	(2)	(3)	(4)	(5)
PLIB	-2.393*** (0.546)	-2.474*** (0.496)	-1.914*** (0.541)	-2.303*** (0.704)	-2.294*** (0.701)
Gini		54.22* (29.21)	82.19*** (27.21)	87.08*** (29.62)	85.07*** (29.03)
Remittances		-0.0097*** (0.0019)	-0.0077*** (0.0020)	-0.0101*** (0.0039)	-0.0099*** (0.0036)
Education			-10.10** (4.223)	-8.383* (4.444)	-8.951** (4.232)
Family Size				-1.238 (2.076)	
No. of Dependents					-1.254 (1.989)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	30.16	88.20	107.71	111.05	111.65
P-Value	0.000	0.000	0.000	0.000	0.000

Note: HCR is the dependent variable, and N is 32 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

In Table 2A above, we checked the robustness of our core findings by including various control variables considered to be major factors of poverty. The inclusion of these controls does not alter the sign and significance of our core variable (i.e., PLIB). The sign remains negative and statistically significant in all models. Gini (a measure of income inequality) is positive and significant in all models; it depicts that income inequality gives rise to poverty (HCR). The association between income inequality and poverty is positive (Heo & Doanh, 2009; Liang, 2007; Popli, 2010; Topalova, 2007). Remittances from migrants also play a positive role in the improvement of well-being.

Table 2B. Trade policy and poverty (PG).

Variable	(1)	(2)	(3)	(4)	(5)
PLIB	-0.294** (0.137)	-0.300** (0.146)	-0.132 (0.167)	-0.390* (0.200)	-0.355* (0.200)
Gini		10.27 (8.192)	17.22** (7.932)	19.67** (9.234)	18.36** (8.967)
Remittances		-0.0019*** (0.0005)	-0.0012** (0.0006)	-0.0029*** (0.0011)	-0.0026** (0.0010)
Education			-2.769** (1.359)	-1.841 (1.366)	-2.307* (1.314)
Family Size				-0.997 (0.619)	
No. of Dependents					-0.842 (0.585)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	20.08	43.28	49.62	61.56	59.37
P-Value	0.010	0.000	0.000	0.000	0.000

Note: PG is the dependent variable, and N is 32 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

Remittances are negatively associated with poverty, implying that a rise in the stock of foreign remittances significantly reduces the level of poverty. The reason behind this is that when these remittances are used in investment projects, they provide job opportunities for the unemployed (Acosta, Calderon, Fajnzylber, & Lopez, 2008; Mughal & Anwar, 2012). Education is negatively and significantly related to the level of poverty; as the average years of schooling rises, the poverty level goes down and vice versa (Cheema & Sial, 2014; Kamuzora, 2001). Family size is

negatively and insignificantly correlated to poverty. This means that an increase in the size of a household reduces poverty as more family members will participate in the labor force (Kamuzora, 2001). The dependency ratio also plays an imperative role in determining poverty. An increase in the number of dependents is associated with poverty reduction. A negative correlation exists between poverty and the number of dependents. These results are not sensitive to the inclusion of all the control variables.

Table 2B reports the results of the robustness check when the PG measure of poverty is adopted. Income inequality has a positive and significant relationship with poverty, and it plays a vital role in increasing poverty. Remittances to the poor families from family members working abroad help them get out of poverty. Similarly, an increase in the average number of years of schooling increases the welfare of the poor. Family size and number of dependents are negatively and insignificantly linked to poverty. The addition of these controls does not affect the sign of the trade liberalization index (PLIB).

Table 2C. Trade policy and poverty (SPG).

Variables	(1)	(2)	(3)	(4)	(5)
PLIB	-0.157* (0.0905)	-0.058 (0.0547)	-0.0051 (0.0649)	-0.128* (0.0730)	-0.109 (0.0740)
Gini		3.337 (2.963)	5.337* (2.989)	6.324* (3.562)	5.726* (3.464)
Remittances		-0.0005*** (0.0002)	-0.0003 (0.0002)	-0.0012*** (0.0004)	-0.0010*** (0.0003)
Education			-0.848 (0.533)	-0.451 (0.522)	-0.686 (0.506)
Family Size				-0.519** (0.232)	
No. of Dependents					-0.425* (0.219)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	193.95	40.02	39.03	63.81	57.27
P-Value	0.000	0.000	0.000	0.000	0.000

Note: SPG is the dependent variable, and N is 32 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

Table 2C presents the results of the robustness check of the effect of trade liberalization on poverty when the SPG measure of poverty is used. The table shows the consistency of our results when additional control variables are incorporated. Poverty is positively and significantly affected by income inequality. Remittances from abroad have a considerable and significant impact on the incidence (HCR), depth (PG), and severity (SPG) of poverty. Education also proves to be an important determinant of poverty alleviation. Family size and the number of dependents are negatively and significantly correlated to poverty in Pakistan. The addition of these controls does not alter the sign and significance of PLIB. All the above three tables demonstrate that our findings are robust to all FGT measures.

In our core models, whether poverty is measured by the HCR, PG or SPG, the study found a negative and significant association between poverty and trade liberalization. The findings depict that the reduction in import tariffs increased the vulnerability of the poor. Trade liberalization highly and significantly affects poverty under HCR, and less significantly affects poverty under PG and SPG.

6.2. Lagged Trade Policy and Poverty Analysis in Pakistan

Finally, this study examines the variations in poverty resulting from the decline in protection rate that might take time to appear by exploring the link between lagged trade policy and poverty (HCR, PG, and SPG). The results of the lagged trade policy are reported in Table 3. The crux of our main findings is the same as in the above specifications; it reveals that there is a linkage between lagged policy and poverty. Our results are robust and are not sensitive to different poverty indices (i.e., HCR, PG, and SPG).

Table 3. Lagged trade policy and poverty (FGT measures).

Variable	HCR	PG	SPG
Lagged Trade Policy	-2.691***	-0.372**	-0.213**
	(0.585)	(0.153)	(0.0930)
Time Indicator	Yes	Yes	Yes
Wald Statistic	32.14	18.29	91.80
P-Value	0.000	0.010	0.000

Note: HCR, PG, and SPG are the dependent variables in the above models. N is 32 in all models. The standard errors are shown in brackets. The asterisks (i.e., **, ***) represent the significance levels at 5%, and 1%, respectively.

In columns 1, 2 and 3 of the above table, poverty is measured by HCR, PG, and SPG, respectively, and it shows that the coefficient of lagged trade policy is negative and significant in all specifications. This implies that lagged trade policy contributes to increasing poverty in Pakistan over time.

6.2.1. Lagged Trade Policy and Poverty (Robustness Analysis)

The robustness analysis of the impact of trade liberalization on poverty is anticipated using different versions of Equation 1. Lagged analysis of trade liberalization and poverty association depicted that trade liberalization negatively and significantly affects poverty over time in Pakistan. To check the sensitivity of the overall results, we included some control variables in our lagged analysis. These variables include income inequality, remittances, education, family size, and number of dependents. The results of the lagged robustness analysis are reported in Table 3A for HCR, Table 3B for PG and Table 3C for SPG. The standard errors associated with each variable are shown in brackets.

Table 3A presents the results of robustness analysis of lagged trade policy and poverty when poverty is measured by HCR. It shows that there is a significant association between lagged trade policy and poverty in all models. The sign of the main variable of interest (i.e., lagged trade policy) is negative in all models, which depicts that lagged trade policy increases poverty in Pakistan. The inclusion of control variables does not affect the significance and sign of our core variable (i.e., lagged trade policy), which is still negative and significant. Table 3B contains the results of the robustness analysis of lagged trade policy and poverty when poverty is measured by PG. In all models of the above specification, lagged trade is negatively and significantly correlated with poverty except in the third column. All the above models indicate that over time trade liberalization contributed to increase poverty. Our findings are insensitive to all control variables.

Table 3A. Lagged trade policy and poverty (HCR).

Variable	(1)	(2)	(3)	(4)	(5)
Lagged Trade Policy	-2.690***	-2.592***	-2.005***	-2.628***	-2.572***
	(0.585)	(0.533)	(0.603)	(0.757)	(0.757)
Gini		64.51**	86.30***	93.97***	90.46***
		(31.77)	(28.89)	(32.21)	(31.34)
Remittances		-0.009***	-0.007***	-0.0109***	-0.0103***
		(0.002)	(0.002)	(0.004)	(0.003)
Education			-9.836**	-7.140	-8.209*
			(4.742)	(4.961)	(4.732)
Family Size				-2.150	
				(2.206)	
No. of Dependents					-1.932
					(2.097)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	32.14	84.04	98.35	110.59	110.46
P-Value	0.000	0.000	0.000	0.000	0.000

Note: HCR is the dependent variable, and N is 28 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

Table 3B. Lagged trade policy and poverty (PG).

Variable	(1)	(2)	(3)	(4)	(5)
Lagged Trade Policy	-0.3722** (0.1531)	-0.3476** (0.1647)	-0.1789 (0.1934)	-0.5178** (0.2218)	-0.4733** (0.2232)
Gini		12.5090 (9.0475)	17.8665** (8.5772)	21.7377** (10.1334)	9.8232** (9.8053)
Remittances		-0.0018*** (0.0006)	-0.0012* (0.0006)	-0.0034*** (0.0012)	-0.0029*** (0.0011)
Education			-2.6259* (1.5239)	-1.3707 (1.5291)	-1.9998 (1.4683)
Family Size				-1.2851* (0.6632)	
No. of Dependents					-1.0774* (0.6254)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	18.29	37.85	41.28	59.17	56.08
P-Value	0.0107	0.000	0.0000	0.0000	0.0000

Note: PG is the dependent variable, and N is 28 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

Table 3C depicts the results of the robustness analysis of lagged trade policy and poverty when poverty is measured by SPG. The results indicate that the coefficient of lagged trade policy has a negative relation with poverty, as we have found in all the above specifications. It implies that a reduction in import tariffs leads to an increase in poverty level in Pakistan over time. Moreover, it is also clear that our results are not sensitive to the inclusion of the relevant controls.

To sum up, there is a negative link between trade liberalization and poverty, and this association is robust to all the FGT measures. For robustness checks, income inequality, remittances, education, family size, and number of dependents were used as control variables. The results of the robustness checks proved the consistency of our findings. We also checked the impact of lagged trade policy and found that it is negatively connected to poverty. The robustness of lagged trade policy and poverty linkage was further checked by carrying out a sensitivity analysis of our results. Our findings remain consistent in all specifications and show that there is a trade-off between trade liberalization and poverty.

Table 3C. Lagged trade policy and poverty (SPG).

Variable	(1)	(2)	(3)	(4)	(5)
Lagged Trade Policy	-0.213** (0.093)	-0.069 (0.063)	-0.014 (0.076)	-0.167** (0.082)	-0.145* (0.084)
Gini		3.810 (3.303)	5.395* (3.250)	7.011* (3.918)	6.168 (3.798)
Remittances		-0.0005** (0.0002)	-0.0003 (0.0002)	-0.0013*** (0.0004)	-0.0011*** (0.0004)
Education			-0.8178 (0.5970)	-0.2908 (0.5855)	-0.5877 (0.5660)
Family Size				-0.6124** (0.2497)	
No. of Dependents					-0.5005** (0.236)
Time Indicator	Yes	Yes	Yes	Yes	Yes
Wald Statistic	15.16	32.34	30.78	57.81	50.27
P-Value	0.034	0.000	0.000	0.000	0.000

Note: SPG is the dependent variable, and N is 28 in all models. The standard errors are shown in brackets. The asterisks (i.e., *, **, ***) represent the significance levels at 10%, 5%, and 1%, respectively.

7. CONCLUSION

When Pakistan liberalized its trading environment, substantial changes were made in its trade policy and were enforced between 1988 and 2005. In this study, we empirically investigated the association between trade

liberalization and poverty in Pakistan. For the measurement of trade liberalization, import tariffs are used, while poverty is estimated by utilizing all the FGT measures. Our empirical findings show that trade liberalization contributed to increasing poverty in Pakistan. It was also found that a tariff cut is correlated with rising poverty.

In our core models, a negative and significant association was found between poverty and openness of trade, regardless of whether poverty is measured by the HCR, PG, or SPG. Our findings are robust and are not sensitive to poverty indices. The addition of other control variables does not affect the sign of the trade liberalization indicator (PLIB). Similarly lagged trade policy also negatively affects poverty in Pakistan. The robustness analysis of lagged policy provided the same results regarding the sign and significance of trade liberalization indicator (i.e., lagged trade policy) in the lagged analysis. The results point out that, during the trade liberalization regime, Pakistan's response toward trade remains low. Based on our findings, this study suggests that policymakers should implement policies that will encourage the involvement of the poor in external markets if they are to benefit from trade liberalization. These reforms may include the provision of infrastructure, credit, or training that facilitates the access of the poor population to external markets.

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