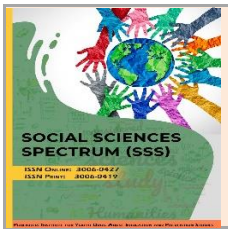

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Trade Agreements and Transnational Factors Affecting Pakistan's Meat Export: A Gravity Analysis

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Abstract

With a significant increase in global meat consuming population, demand for meat is on a rise. Pakistan being an agrarian economy earns significant export revenue from meat and has huge potential to expand its export base. This study identifies the impact of Trade agreements and various other Transnational factors on Pakistan's meat export. The study uses cross country panel data with 22 trade partners of Pakistan from 2001 to 2023 and uses commodity specific gravity model to study the impacts. It is evident from the research results that GDP of Pakistan and its trading partners, Population of the trading partner both significantly impact Pakistan's meat exports. Whereas distance has a negative relation with exports. However, exchange rate and domestic livestock population in Pakistan has no significant impact on meat exports. Likewise, existence of FTA and PTA did not have any impact on boosting Pakistan's meat exports. The findings of this study may provide valuable input to the policy makers and appropriate policies may be devised in the future for addressing the shortcomings hampering the meat exports.

Keywords: Meat Export, FTA, PTA, Gravity Analysis, Random Effect Regression.

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Introduction

Pakistan is the 42nd largest economy in terms of GDP (current US$) and ranks 66th in terms of total exports (OEC 2024). Being an agrarian economy and having appropriate climate for livestock rearing a large population relies on livestock and agriculture as their primary source of income. Livestock sector contributes 14% to the country's GDP, 60% to Agriculture sector (PBS 2024) and has a huge growth opportunity. However, it is still a small sector which faces myriad challenges in different forms.

It is pertinent to mention that aside from being the fifth most populous country in the world, Pakistan's Bovine animal population is also expanding at speedy rates. In 2019 Pakistan's domestic meat production was recorded at 5 million tons and was approximated to be growing at 5% annually (PES 2020). Currently it has a population of 94 million bovine animals and 112 million goats and sheep (TDAP). Meat serves as a crucial source of nutrition. With growing demand of meat globally, it is categorised as an emerging international market with huge potential.

In year 2023 alone, global meat exports of bovine meat amounted to US$ 61.5 billion (UN Comtrade 2023). In which Pakistan's export amounted to merely US$ 352 million (UN Comtrade 2023). Pakistan being an agrarian economy has huge potential for tapping into the growing meat trade market. With a bulging middle class and growth in global population, meat demand is rising in all sectors, including fresh and chilled meat. Meat export market is largely dominated by Brazil, Australia and United States, which account for approximately 50% of the total meat exported globally. (UN Comtrade). Pakistan's total meat export, however, accounted for a mere 0.5% of total world exports. This sluggish growth can be contributed to numerous factors which include limited healthcare facilities, lack of proper knowledge and insufficient infrastructure.

Currently there are only 34 registered slaughterhouses in the country that can process meat according to international exporting standards (TDAP). In addition to better domestic infrastructure, various transnational factors and trade agreements play a pivotal role in a country's export dynamics.

This paper examines Pakistan's meat export to international partners and uses the gravity model to analyse and evaluates the difference that existence of trade agreements and transnational factors such as common language, border, religion,

distance and similar factors may have on its exports. Currently Pakistan has free trade agreements with China, Malaysia and Sri Lanka, is part of the SAARC and also has preferential trade agreements with Iran, Indonesia, and Turkey. It is important to note that few researchers have already worked on the topics similar to this research with a rather broader range of commodities. The most recent work of Hayat and Ishaq (2023) inquired how cross border factors and trade agreements are impacting Pakistan's Meat, Milk and Fisheries export. They used gravity analysis for their research. Likewise, Zaheer and Hussain (2020) evaluated the role of rural women in development and export earnings of Pakistan's dairy industry. Although these research papers explore the export potential, they however were not focused on meat's export dynamics. It is a crucial topic, and the findings of this paper could serve as a valuable reference for policymakers in Pakistan.

Literature Review

Meat trade is an important element in the global trade. Various researchers have used qualitative and quantitative approaches to explain the trade dynamics. To determine the dynamics of export of Chinese meat industry, Shahriar et al. (2019) used gravity model to analyse the Chinese pork

export. The study used 11 variables and concluded that common language, border, distance, WTO membership have a significant and positive impact on boosting the meat export. It also adds that GDP in both importing and exporting country play a critical role in boosting trade.

Likewise, Karemera et al (2015) analysed meat trade flows and concluded that population, distance, exchange rate, and producing capacity plays a vital role in meat trade. In line with these finding, Teweldedhin et al. (2013) studied the factors affecting Namibia's red meat trade in Africa. The findings suggest that firstly, existence of a trade agreement especially regional trade agreement helps boost export. Secondly, distance is an important element and lesser distance, and common borders are positive contributors towards export growth. It also highlights that consumer preferences in the target market are also crucial in determining trade dimension. For instance, in South Africa goat meat was preferred whereas in West Africa fresh and chilled beef was more in demand. It further adds that higher population meant more meat demand in the partner country.

Ridely et al. (2024) study the impacts of tariff and non-tariff barrier on trade. Both measures are usually used to protect the domestic producers. Non-tariff measures are often imposed in a manoeuvred way so that it could benefit local producers. However, in meat trade Sanitary and phytosanitary (SPS) measures have expanded. The paper runs two simulations using commodity specific gravity model to study the difference that tariff and non-tariff barriers have on trade. The results suggest that non-tariff measures (NTM) can have both positive and negative effect on trade. NTM can boost trade if they are implemented after streamlining the regulations. It further adds that tariff measures generally slowdown the trade whereas NTMs, specifically SPS measures expand trade. Further they add that trade boost due to lowering tariff was actually lower in comparison to trade creation with implementation of SPS measures.

In consonance with these findings, Santeramo et al. (2019) suggest that when NTMs are implemented it convinces the aspirants of export growth to pursue trade regulations which can build consumer confidence and eventually lead to higher exports. Furthermore, trade agreements are also referred to as important tools for trade creation. Using time series data, Koo et al. (1994) evaluate trade flow in the meat market. The study concludes that long term trade agreements along with meat quality and production capacity positively influence the meat trade. It also adds that if importing country's GDP rises, it also raises exports whereas quotas and other border protection policies may discourage trade flows. Similarly, Ghazalian et al. (2011) use gravity model and suggest that if trade agreements are formed it will boost trade between the member countries and would divert a modest amount of trade from non- member towards the member countries.

Masood et al (2023) explored the trade potential of Pakistan with other south Asian countries using the gravity model. Research used common border, language, landlocked-ness distance and GDP to evaluate the trade flow The results suggest GDP increase in partner country will result in higher exports. Whereas common language had a negative impact on trade. Similarly increase in distance had a negative impact on exports. Further, tariff was reported to have an inverse relationship with the trade as tariffs worked as trade diversion. Research also suggests that regional trade agreements (RTA) such as SAFTA have potential to improve the trade. A new RTA could boost the Pakistani exports by 15%. Similarly, Quershi and Shah (2020) study the impact of trade agreement and export creation. In an analysis of 55 industries, they found that presence of free trade agreement led to trade creation in 45 industries.

Data and Research Method

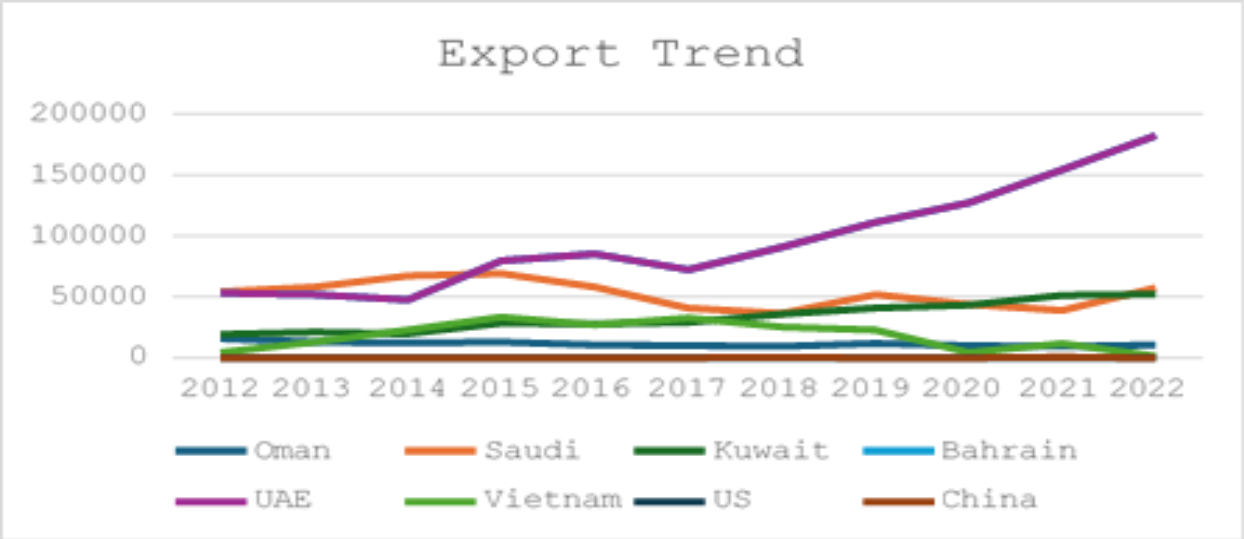
In this study, data has been collected through various sources. Primary sources have been World Bank Data, UNComtrade, Pakistan Bureau of Statistics and Economic Survey of Pakistan. For

analysis, commodity specific Gravity model has been used to analyse the impact of trade agreements and other factors influencing Pakistan's meat exports. Gravity model has been frequently and widely used by a lot of researchers to evaluate the trade flows between countries and regions. In simple terms, the model depicts that trade flow or exports are dependent on the distance between the partners and the GDP of the trading countries.

Figure 1.0

Pakistan's Meat Exports to Trading Partners (Million USD 000)

Trade Partner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Oman	16000	13070	12500	13200	10500	10100	9710	12000	9790	9360	10500
Saudi Arabia	54100	58300	67200	69100	58000	40900	36600	52100	44000	38900	57700
Kuwait	19300	21100	20100	28300	27900	29000	35800	41000	43200	51100	52100
Bahrain	53200	52100	47600	79800	84900	72500	90600	111000	127000	154000	182000
UAE	53200	52100	47600	79800	84900	72500	90600	111000	127000	154000	182000
Vietnam	4210	13200	23200	33500	27200	32600	25400	22700	4480	11900	1480
United States	0	0	0	0	20	0	0	0	114	152	205
China	29.5	0	0	0	23	70.4	633	0	236	825	0



Research Study Model

$$ln(X_{pjt}) = A + \alpha 1 ln(Ypt) + \alpha 2 ln(Yjt) + \alpha 3 ln(Dpjt) + \beta 1 \cdot CommonReligion_{pjt} + \beta 2 \cdot PopAge_{jt} + \beta 3 \cdot TradeAgreement_{pjt} + \beta 4(ExchangeRate_{pjt}) + \beta 5 \cdot SPSRegulations_{jt} + \beta 6 \cdot Livpop_{pt} + \varepsilon ij$$

The variable description:

A: Intercept/ Constant

Xij: This represents the meat exports from Pakistan

$\alpha 1$, $\alpha 2$, $\alpha 3$, $B1$, $B2$, $B3$, $B4$, $B5$, $B6$: Coefficients of the variables

$lnYi$: It is the GDP in Pakistan

$lnYj$: It is the GDP in country j

lnDij: This is the distance between the trading partners

Common Religion: It is 1 if the trading countries have common religion and 0 if not

PopAge: This is percentage the partner country's population aged 15-64

TradeAgreement: It is 1 if there is a trade agreement between Pakistan and the partner country and 0 otherwise

ExchangeRate: The real exchange rate between the countries (1 foreign currency unit = Pak Rupees)

SPSRegulation: 1 If Sanitary and Phytosanitary compliance is a requirement in partner country and 0 if not.

Livpop: Total population of Cattle, sheep, cow and bovine animals in Pakistan from 2002-2023

Figure 2.0

Descriptive Statistics

Variable	Min	Maximum	Standard Deviation	Mean
Export Xpj	0	191,000,000	20,900,000	7,562,463
GDP (Yj)	0	27,400,000,000,000	4,150,000,000,000	1,320,000,000,000
GDP (Yp)	97,900,000,000	375,000,000,000	84,100,000,000	246,000,000,000
Distance (Dij)	374.65	11,392.76	2,130.52	3,536.24
PopAge(pop)	57.5	83	6.28	68.37
Exchangerate (exgr)	0	912.66	119.25	62.2
Trade Agreement (trdag)	0	1	0.46	0.30
SPSRegulation (Spsr)	0	1	0.44	0.74
Common Religion(crlgn)	0	1	0.44	0.74
Livpop	126.3	224.7	29.48	171.28

ln_exprt	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
ln_gdpy	.684**	.226	3.03	.002	.242	1.126
ln_gdppak	1.812***	.684	2.65	.008	.471	3.153
ln_dist	-3.407***	.688	-4.96	0	-4.755	-2.06
crlgn	.438	1.02	0.43	.668	-1.562	2.438
pop	.299***	.066	4.53	0	.17	.429
trdag	-2.058**	.959	-2.14	.032	-3.939	-.177
exgr	.001	.001	0.79	.428	-.001	.003
spsr	-.933	1.18	-0.79	.429	-3.245	1.379
livpop	-.003	.008	-0.35	.725	-.019	.013
Constant	-44.574***	16.598	-2.69	.007	-77.107	-12.042

Mean dependent var	13.802	SD dependent var	3.300
Overall r-squared	0.612	Number of obs	279
Chi-square	181.766	Prob > chi2	0.000
R-squared within	0.354	R-squared between	0.731

**** p<.01, ** p<.05, * p<.1*

Figure 3.0 Regression Results

Interpretation of Results

Ln_gdpy which is the GDP of the trading partner has a coefficient of 0.684 which is significant at 1%. This depicts a positive relation and reflects that a 1% increase in GDP of the trading partner can lead to a possible increase of 0.684% in Pakistan's meat exports, holding other factors constant. Similarly, ln_gdppak which is the GDP of Pakistan also has coefficient of 1.81 which is significant at 1%. This means that increase in domestic GDP can also positively impact Pakistan's meat exports. Contrastingly, when we look at distance, ln_dist has a coefficient of – 3.40 which is also significant at 1%. This means that a 1% increase in the distance between Pakistan and its trading partners has a strong negative impact on the country's exports.

When we look at population, variable pop has a positive coefficient of 0.299 which is significant at 1%. This explains that a 1% increase in the population of the trading partner can possibly increase the meat exports by 0.299% holding other factors constant. Surprisingly, trade agreement has a coefficient of -2.058 which is significant at 5%. This suggests that having a trade agreement has a negative relation with Pakistan's meat export. While common religion (crlgn) though has a positive coefficient of 0.438 but it is insignificant. Similarly, exchange rate has a coefficient of

0.001 but it is insignificant. Having Sanitary and phytosanitary (spsr) is also insignificant with a coefficient of -0.933 along with variable livpop which is insignificant with a negative coefficient of -0.003.

In a parallel analysis, regression was controlled for year and country variable. The results showed a similar trend, however, the coefficient of trdag plunged from – 2.04 to -14.03.

Discussion and Implication

Pakistan's meat export depends on various tangible and intangible elements that directly or indirectly impact the trade flow. After careful analysis, 6 variables were selected in addition to GDP of the home country, trading partner and the geographical distance. The initial hypothesis was that trade agreements play a pivotal role in promoting bilateral trade however, in case of Pakistan's meat export, trade agreement play no significant role. There are many possible explanations for this benign role of trade agreements. Firstly, Pakistan has preferential and free trade agreements with Indonesia, Malaysia, China, US and Maldives. Aside from China, rest of the trading partners has significant distance from Pakistan and meat being a perishable good could only be exported to these countries in presence of ideal cold transport infrastructure which unfortunately is a major predicament for Pakistan.

In addition to this Pakistan does not has a specific meat trade agreement with any of its partner countries which make the existence of existing trade agreements insignificant in this meat specific research. Similarly, exchange rate also shows an insignificant impact on the exports. This means that there are bigger predicaments hampering the meat exports than the exchange rate policy. In addition to this, most of the countries have notified SPS regulations in compliance with WTO arrangements to ensure that meat products are fully compliant to the international safety standards. Pakistan is currently complying with the SPS regulations; however, it still has no significant impact

on its meat exports. The primary reason for this may be a negative perception of animal health in Pakistan. Previously the country has faced a challenge of foot and mouth disease in the cattle which seriously impacted its meat export reputation. In addition to this, GDP of Pakistan and GDP of its trading partner both have a positive impact on the export. These findings are in line with the theoretical beliefs that income plays a vital role in promoting trade. Increasing GDP of trading partner means that that it has increased income to finance its imports.

Likewise, findings about impact of distance on trade also supports the theoretical assumption that more distant the trading partner is, the costlier it is to trade. However, in our findings the coefficient is considerably large which can be explained by the fact that meat exports at more distant places require more pronounced cold chain infrastructure which lacks in Pakistan. Though Pakistan is one of the big producers of Halal meat and is in close distance to 70% of the Muslim countries, still common religion does not play a role in determining the meat export. Whereas a growth in young meat-eating population of the trading partner can significantly increase exports.

Conclusion

Meat trade is a rapidly increasing market with huge potential for growth. Currently Pakistan has a limited meat trade base with only 22 countries while its actively trading with only 8 partners. Though it is one of the largest producers of the halal meat still it only captures less than 5% of the halal meat market. The sluggish growth of Pakistan's meat export can be contributed to myriad factors however, absence of commodity specific (meat) trade agreement is one of the most prominent reasons. Currently Pakistan has limited agreements with friendly countries for supply of meat. It needs to actively engage in endeavours for capturing new markets. Another bottleneck is the limited meat processing and exporting infrastructure in the country. Air cargos are currently used which can only transport a limited amount of meat. To expand its capacity country needs to encourage private investment in the sector. Furthermore, international best practices in the sector should also be adopted. This could be done by securing technical assistance agreement with the leading global exporters. In addition to this, domestic GDP also plays a positive role in appreciating the exports and ensures an enabling environment for private investments which can eventually lead to growth of the sector so it could develop in an industry in the long run. So, Pakistan needs to ensure economic stabilisation for long run sustainable growth. To conclude, with a growing livestock population and expanding global meat market Pakistan can emerge as a prominent exporter if it addresses its technical gaps at home and engages in meaningful diplomacy for capturing a bigger share of the market through new agreements.

Conflict of Interest

The authors showed no conflict of interest.

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