The Welfare and Production Effects of Border Restriction: Evidence from Nigeria's 2019 Border Closure

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Abstract

This study investigates the welfare and production effects of Nigeria's 2019 land border closure policy through both theoretical and empirical analyses. Using classical trade theories such as the partial equilibrium framework of Viner (1937), optimum tariff models by Johnson (1951), and modern extensions incorporating network effects, the study explores how border closures influence domestic markets. Empirically, the study employs monthly price data from the National Bureau of Statistics (NBS) and annual production data from the Food and Agricultural Organization (FAO), covering key agricultural products most affected by the closure. A combination of paired t-tests, multiple regression models, and Difference-in-Differences (DiD) analysis is applied to estimate the policy's effects on food prices and domestic agricultural production. The results reveal a substantial and statistically significant increase in domestic food prices following the border closure, while evidence of significant production increases remains weak and statistically insignificant. These findings summmmggest that while protectionist policies can restrict imports and temporarily shield domestic industries, their effectiveness in stimulating domestic production is limited without complementary investments, institutional reforms, and capacity-building measures. The study contributes to the broader literature on trade barriers in developing economies by providing empirical insights into the complex trade-offs between consumer welfare and domestic production under protectionist trade regimes.

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Chapter 1 - Introduction

Trade protection measures—such as tariffs, quotas, and outright border closures—are widely used across the world to achieve economic, political, and security objectives (Rodrik 2018). For developing economies like Nigeria, these policies are often presented as tools to stimulate domestic production, reduce smuggling, protect infant industries, and achieve greater food self-sufficiency (World Bank 2020; Aremu et al. 2023). In August 2019, Nigeria abruptly closed its land borders with neighboring countries, targeting persistent smuggling of goods, mostly agricultural products (Olisah et al. 2022; Nexia Nigeria 2019). The Nigerian case offers an important real-world opportunity to study the complex trade-offs and outcomes of protectionist trade policy in a developing country context. On the one hand, protectionist policies can offer temporary relief to domestic industries, potentially improving domestic production and employment in the short run (Johnson 1951). On the other hand, such policies may also lead to significant consumer welfare losses due to rising prices, supply chain disruptions, and unintended macroeconomic consequences (Freund and Özden 2008; Grennes 2017).

This thesis is motivated by a central research question: What were the effects of Nigeria's 2019 land border closure on domestic food prices and agricultural production? Understanding these outcomes provides both theoretical and policy-relevant insights for trade policy design, particularly in developing economies that operate in global markets but face significant domestic production challenges (Krugman and Obstfeld 2009).

Prior to the 2019 closure, Nigeria's trade policy regime was already characterized by substantial import restrictions. Tariffs on imported rice stood at 70% while bans existed for frozen poultry and certain vegetable oils (International Trade Administration 2023; USDA 2018). Despite these measures, Nigeria's porous borders with countries such as Benin, Togo, and Niger facilitated widespread smuggling and informal trade flows that undermined government efforts

to protect domestic industries (Golub 2012; Woubet and Albert 2020). The 2019 land border closure represented an escalation of Nigeria's longstanding import substitution strategy. The policy fully sealed land borders for over a year, targeting agricultural imports most vulnerable to smuggling while still permitting sea-borne imports subject to official tariffs (World Bank 2020). The government argued that this would finally break smuggling networks, strengthen domestic agricultural value chains, and reduce foreign exchange outflows (Aremu et al. 2023; Olisah et al. 2022)

To investigate the effects of this policy, this study draws on both theoretical and empirical literature. Theoretically, the analysis builds on classical models of trade protectionism, including the partial equilibrium framework of Viner (1937) and Meade (1955), and optimum tariff theories of Johnson (1951) and Edgeworth (1925), which describe how tariffs affect domestic welfare, consumer prices, and trade balances. Empirically, the study utilizes data from two primary sources: (i) monthly average prices of selected food items between 2017 and 2021 obtained from Nigeria's National Bureau of Statistics (NBS 2021), and (ii) annual agricultural production data from 2015 to 2023 sourced from the Food and Agricultural Organization (FAO 2021). The analysis focuses on products most directly affected by the border closure—rice, frozen chicken, seafood, palm oil, and vegetable oil—as well as a control group of products less affected by the border closure.

For the price analysis, a paired t-test is employed to compare pre- and post-closure food prices. Additionally, a multiple linear regression model estimates the impact of the closure after controlling for inflation and exchange rate fluctuations, where prices are log-transformed to allow for elasticity interpretation. For the production analysis, a Difference-in-Differences (DiD) approach is implemented to estimate changes in domestic production for affected versus unaffected products.

The results show that the border closure had a substantial and statistically significant effect on domestic food prices. The paired t-test indicates an average increase of approximately ₦196.67 in monthly food prices across the selected products (NBS 2021). The regression analysis, which accounts for inflation and exchange rate fluctuations, estimates that the closure led to a 14.6% increase in food prices (Adewuyi and Alege 2020; CBN 2020). Notably, the price of frozen chicken rose by more than ₦400 per kilogram, reflecting Nigeria's previous heavy dependence on imports for frozen poultry (Aremu et al. 2023; Olomola 2020).

These price effects are consistent with standard trade theory predictions that restricting supply leads to higher domestic prices when domestic producers cannot fully compensate for lost imports (Krugman and Obstfeld 2009; Akpan et al. 2014; Ulimwengu et al. 2012). Additional contributing factors include exchange rate depreciation, global energy price shocks, and pandemic-induced supply chain disruptions (World Bank 2020; FAO 2021; Otekunrin et al. 2021).

In contrast, the production effects of the border closure are far less conclusive. The Difference-in-Differences model shows no statistically significant increase in production for affected products (Ayanwale and Egwuma 2022). In some cases, production even declined after accounting for product-specific and year-level effects (Adeniran et al. 2019; Goldberg and Pavcnik 2007; Rodrik 2018). Several factors may explain this muted response, including Nigeria’s dependence on imported agricultural inputs (seeds, fertilizers, machinery), limited access to credit, infrastructural deficits, and regional insecurity that disrupted farming activity (Olomola 2020; FAO 2021).

These findings reinforce concerns that trade protectionism, when implemented without accompanying domestic investment and institutional reforms, may fail to generate sustainable production responses while imposing significant consumer welfare costs (Rodrik 2018; Goldberg and Pavcnik 2007).

This study contributes to the literature on trade barriers in developing countries by providing an empirical evaluations of Nigeria's 2019 border closure, integrating both food price and domestic production outcomes. Unlike most previous studies that focus on either price inflation or trade flows, this thesis applies an integrated empirical strategy combining paired t-tests, regression analysis, and Difference-in-Differences models using both price and production data. The analysis demonstrates that while the closure succeeded in raising prices, it failed to generate significant increases in production, highlighting the limited capacity of trade barriers to induce domestic supply responses in the absence of complementary reforms. These findings offer important policy lessons for Nigeria and other developing economies navigating the delicate balance between protectionism and economic development..

Chapter 2 - Theoretical Framework and Literature Review

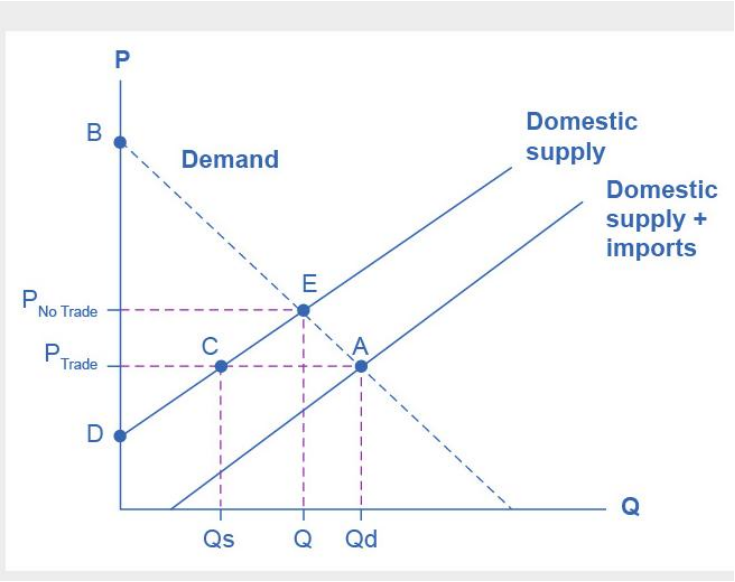
2.1 Theoretical Foundations of Tariffs and Trade Restrictions

The partial equilibrium framework and assumption is **attributed to early neoclassical economists**, particularly Jacob Viner (1937) and James Meade (1955), who formalized the welfare and efficiency implications of tariffs. It explains how tariffs distort market outcomes in a single good market within a small open economy. The model operates with several assumptions: that there is a small industry in a small country which has no influence on world price, the imported and domestically produced goods are perfect substitutes. In the absence of trade barriers, the world price is below domestic price which makes it cheaper for the country to import goods.

Consumer-Producer Welfare Gains/Loss Over Tariffs -

In this framework, a **small open economy** imports a good at the **world price P_{Trade},** which is below the domestic no-trade price $P_{No\ Trade}$. In the absence of trade barriers, the country imports the good to take advantage of the lower price of imports. The import quantity is the difference between the domestic demand and supply. Inefficient domestic production will eventually lead to dead weight loss and increased price for consumers as producers will eventually increase price to a market clearing level.

Figure 1: Effect of Tariffs - Hypothetical Supply and Demand When there is free trade, the equilibrium is at point A. When there is no trade, the equilibrium is at point E.



Source: OpenStax - Protectionism: An Indirect Subsidy from Consumers to Producers

In the absence of tariffs, the market equilibrium at point A where Domestic Quantity Demanded (Qd) = Quantity Supplied (Qs) at a price of **P Trade**. When the government imposes a **specific tariff** t, the domestic price rises to **P No Trade**. The cost to suppliers is increased by the exact value of tariff t, imposed by the government. The supply curve shifts further up to a higher price **P No Trade**. The producers benefit from this new price. This higher price allows producers to shift supply from Qs to Q, setting up a new equilibrium at point E. This also means that consumers will pay more for less quantity as demand is reduced from Qd to Q, which represents a drop in consumer welfare from the initial position.

2.2 Modern Extensions of Tariff Theory

Building on the foundational demand and supply framework, Pin (2025) develops a model called the Network Effects, where country-specific tariffs shape trade flows, prices, and welfare within a global economy. The core contribution of this paper is that tariffs imposed by one country affect not only its direct trade partners but also indirectly affect others through a web

of interconnected relationships. The model considers the case of two or more countries with one homogeneous good and for which trade flow is created. For instance, if Country A imposes a tariff on imports from Country B, it may also disrupt trade between Country B and Country C due to changes in supply chains, prices, and trade costs.

If we consider the case of two countries, if country A imposes a tariff on imports from country B, the model predicts that firms in country A will benefit from reduced foreign competition which allows prices to be higher, thereby taking advantage of the excess demand. This reduction in supply also means that consumers in country A will suffer a loss due to higher prices. Similarly, firms in country B (exporting country) will suffer some loss as supply is cut off by imposing country A. The shortage in supply will lead to a fall in price for consumers in country B. This also means that the welfare of consumers in country B will be improved, benefiting from the fall in price.

Pin (2005) argues that since firms want to maximize welfare in terms of profit, and there is more than one country trading homogeneous goods, firms will supply to any destination that yield the best revenue at the prevailing price. In the tariff imposing country, domestic price will adjust upward to clear the existing supply. In the works of Pal (2025), the model argues that tariffs do not only have immediate impact on trade volumes, but rather their impact evolve over time as consumers and firms continue to make adjustment. The response of economic variables such as inflation, GDP and employment do not always show up immediately. They used the Delayed Differential Equations (DDE) to predict the lag between the when tariffs are implemented and when their economic impact is fully realized.

2.3 Gains from Optimum Tariffs

There are lots of literatures in favor of unilateral free trade, the authors insist that unrestricted commerce is beneficial to individual nations and the world at large. However, Kaldor (1940), noted that a country will gain from tariffs when they are not too large and if certain monopoly power exists in the world market. He asserts that tariffs allow the imposing country to renegotiate terms of trade into trade agreement that are favorable, which will ultimately lead to a better bargain in the world market.

Building on this foundation, Johnson (1951) refined these ideas through a formal model underpinned by specific assumptions. He assumes a **two-good, two-country** model in which one good is exported and the other imported. The model incorporates **perfect competition**, **full employment**, and **no transport costs**. It also assumes that both countries must trade along their offer curves for them to be at equilibrium and that government spends tariff revenue on domestic goods only, which is critical in separating the analysis of revenue-maximizing tariffs from welfare-maximizing tariffs (Johnson 1951, p. 32).

In Johnson's model, each point on a country's offer curve represents its export-import trade-off at varying relative prices. When Country A imposes a tariff on imports of good Y, its offer curve shifts inward (from OA to OA′), raising its relative price of exports and thus improving its terms of trade. The area between OA and OA′ represents tariff revenue, which—if spent domestically—can yield net welfare gains. However, if Country B retaliates with its own tariff, B's offer curve shifts inward, reversing A's gains and potentially reducing total welfare due to trade retaliation

The optimal tariff that maximizes welfare is determined by the elasticity of the foreign demand for the exports of the tariff imposing country. Since the government uses tariff as a tool to negotiate favorable terms of trade, the optimal tariff is therefore inversely related to the elasticity of foreign demand for the country's exports. The higher the elasticity for foreign exports the lower the optimal tariffs (Johnson 1951, p. 29). This submission closely follows the works of Edgeworth (1925), that the optimum tariff is one which distorts the home country's offer curve such that it intersects the foreign offer curve at this point of tangency with the highest attainable indifference curve. He noted that tariffs must not be too high so that it does not end up reducing the country's welfare rather than improving it. The central focus is that the tariff must not fall below the free trade position for it to be beneficial to the state.

2.4 Political Dynamics of Protectionism

Freund and Özden (2008) extend Grossman and Helpman's (1994) "Protection for Sale" model to incorporate behavioral traits—specifically, loss aversion and reference dependence—in shaping agent preferences over trade policy. They assume a small open economy with no influence on world prices, consumer demand for variety, and factor owners lobbying for tariffs. Their model balances industrial-size effects and individual losses, finding that government-provided protection is directly proportional to domestic output levels and influenced by agents' behavioral response to price shocks. They find that all things being equal, the level of protection by the government received by firms through lobbying and monetary contribution is determined by the output level of domestic industry. One of the government functions is to prevent loss and improve welfare. When there is a negative shock such as a decline in world price, the government will make effort to prevent such negative consequences by implementing a loss aversion or reference dependence approach, they refer to this as the behavioral effect (Freund and Ozden, 2008). The standard effect is achieved in the instance of a positive shock

where an increase in world price would by default lead to more sales for domestic industries and a higher level of tariff, they refer to this as the standard effect. To be more specific, the government set a reference point for prices. When the world price is below the reference point, the trade policy is applied to shelter domestic firms from global fluctuation, particularly for significant sectors.

Loss of Welfare – in the contribution by Freund and Ozden (2008), they identified a discontinuity in welfare based on the reference price set by the government. There are three cases, first, if the equilibrium domestic price is above the reference price, there is no loss aversion. In the second case if the equilibrium domestic price is below the reference price, then there is loss aversion. The third case represents a corner solution, where the equilibrium domestic price is set precisely at the reference price. They argued that tariff remains a distortion whose size correlates positively with the ratio of domestic output to imports. If the domestic output is high enough when compared to the import level, agents who coordinate and lobby would gain more.

2.5 Empirical Literature on Tariffs

A tariff is a tax on all imported goods. This means that domestically produced goods are exempted from such tax. It is usually based on the location of production rather than the location of the producer. Tariffs remain a source of revenue for the government and their use or lack of use remain a crucial part of both domestic and international trade development. Tariffs raise the price of imported goods on consumers and are imposed to discourage the consumption of foreign goods. On the flip side, tariffs also raise the price of domestically produced goods which are direct substitutes to imported goods (Grennes 2017). Since tariffs serve as a protection for

domestic producers in the industry, one would expect that domestic production would increase when tariffs are imposed.

In the U.S. many products imported are intermediate products, such as steel, lumber (Grennes, 2017). Intermediate Products are goods and services produced to be used in the production of other goods or services and not to be consumed directly. When these kinds of tariffs are imposed, they raise the cost of production for the local producers who need these products for production. The higher cost means that consumers will have to pay more for goods.

2.5.1 Conventional Price Impact of US tariffs on Imported goods

Economic theory posits that imposing tariffs on imported goods typically leads to an increase in their domestic prices. This price elevation is intended to shift consumer demand from foreign to domestically produced goods, thereby protecting local industries and allowing domestic producers to raise their prices in the short term (Grennes 2017). It is widely claimed by some scholars that tariffs create jobs, boost production, increase prices in the industry been protected. However, historical evidence in the U.S. is rather less convincing. For instance, the Smoot-Hawley Tariff Act of 1930, enacted during the Great Depression, significantly raised U.S. tariffs on over 20,000 imported goods. While the intention was to protect American businesses and farmers, the act led to retaliatory tariffs from other countries, a sharp decline in international trade, and exacerbated the economic downturn, with U.S. unemployment rates soaring to approximately 25% by 1933 (Shapiro n.d.)

The 2018 U.S. tariffs were introduced in six main waves throughout the year. The first wave of tariffs-imposed import duties of 30 percent on solar panels and duties of 20-50 percent were applied to washing machines (The Guardian 2018). The second wave of tariffs was 10 percent

duties on aluminum and 25 percent was applied to steel imports (AP News 2025). the third wave of tariffs was imposed on $22 billion of imports from countries like Canada, Mexico and European Union (LSE Blogs, 2019). The fourth and fifth wave was a 25 percent tariff on $34 billion worth of Chinese imports between July and August and a 25 percent tariffs on another $16 billion of Chinese imports in August (Wikipedia, 2025). Finally, another tranche of 10 percent tariffs on an additional $200 billion of Chinese imports was imposed at the end of September (Amiti 2019)

Figure 2 - Increase in Price of Imports After Tariffs

Source: BLS.

Notes: Monthly CPI of ELI HK01 – Major Appliances. Series indexed to 100 in February 2018. The red dashed line indicates the implementation of the January 22nd tariffs on washing machines.

Source: B.I.S

The figure revealed how consumer price increased after the new tariffs were imposed. The authors show that the tariffs have an immediate impact on the U.S. economy despite the falling trend of prices in years before the trade war, prices began to rise sharply after the imposition of new tariffs. The next Figure also shows how prices evolved for each of the six waves in the period under consideration. By comparing the sectors subjected to tariffs and the sectors which are excluded, prices for excluded sectors remained relatively flat across time while the prices

of affected sectors rose considerably. The author suggests that the price movement observed in the affected sector is likely due to the tariffs. The large increase in the CPI also reflects the impacts of the tariffs on consumer and importers alike (Amiti 2019). While higher tariffs create tariff revenue and favor domestic producers, the price consumers must pay to buy imported goods will increase because firms typically pass some portion of the tariff's cost onto consumers. In the U.S. studies have shown that the costs of these tariffs were largely borne by U.S. consumers and businesses, leading to higher prices for various goods and contributing to increased production costs for manufacturers relying on imported materials (LSE Blogs 2019; New York Fed 2019).

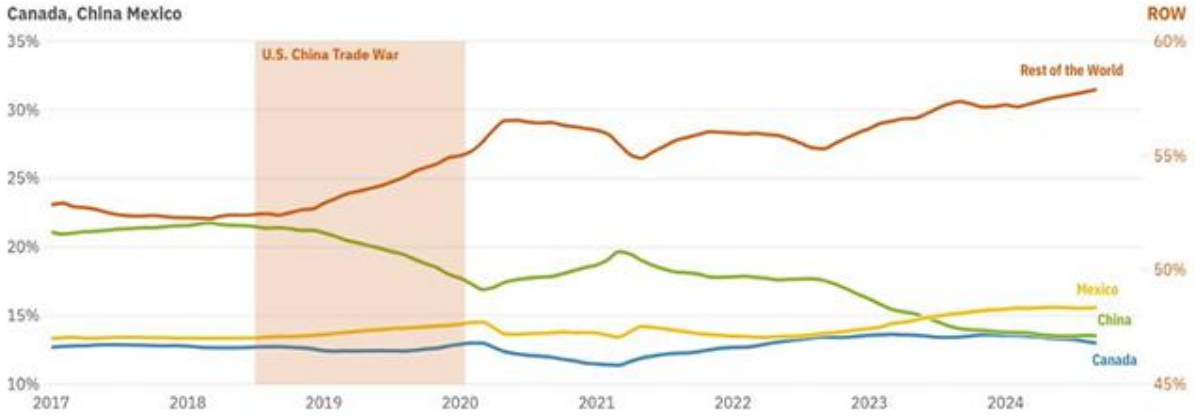
2.5.2 Tariffs, Import and Substitution

The report by Amiti (2019) on the impact of tariffs on imports of affected industry shows that tariffs often lead to shifts in trade patterns. They show that import reduced significantly after imposition of tariffs by Trump administration. The value of imports fell from 25 to 30 percent after tariffs were imposed, while a 10 percent rise in imports was observed for non-affected sectors. The authors suggest that the rise in imports for sectors that were not treated meant that certain import substitutions have taken place. This means that some of the decline observed in the treatment sectors has shifted towards products that could be referred to as substitute products.

Evidence of Trade Diversion - Lower Dependence on Chinese Imports

US reliance on Chinese imports has decreased markedly since 2018. China's share of all US imports declined from more than 20 percent in 2018 to less than 15 percent after 2022, as shown in figure 2. This decline coincided with increasing import shares from Mexico and other trading partners, suggesting active supply chain restructuring by US firms.

Figure 3 - U.S Import Share (2012-2023)



Note: ROW: All countries from which the U.S. imports excluding China, Canada, and Mexico. Import shares are measured as the 12 month moving average of the total value of imports from a country divided by the total value of all imports in a given month.
Source: U.S. Census Bureau (USA Trade Online), authors own calculations.

Source: U.S. Census Bureau (USA Trade Online)

China's Tariffs and Share of US. Exports

In response to U.S. tariffs, China imposed retaliatory tariffs on a set of U.S.-produced agricultural commodities, including 25% tariffs on corn, soybeans, and wheat, and 50% tariffs on pork. Elobeid et al. (2021) utilized the Center for Agricultural and Rural Development (CARD) model to assess the impact of these tariffs. Their analysis revealed that U.S. pork exports to China declined by 4.7% in the long term. The study also found evidence of trade diversion, with countries like Brazil, Canada, and the EU increasing their exports to China to fill the gap left by the U.S. Additionally, the tariffs led to a reduction in the price of pork in both the short and long term by 0.56% and 0.78%, respectively, aligning with economic theories that suggest tariffs can drive down world prices and domestic prices, potentially leading to welfare improvements.

Table 1: China's Tariffs and Impact on Pork, Soybean, Corn and Wheat

Item	Feature	Short term%	10 Year mean%	Long term% (Year 10)
Pork	Export	-4.32	-4.45	-4.70
	Domestic use	0.85	0.77	0.81
	Retail price	-0.56	-0.66	-0.78
Soybean	Export	−28.97%	−29.59%	−31.17%
	Domestic use	9.34%	9.14%	8.49%
	Farm price	−14.78%	-14.66	-15.79
Corn	Export	3.53	4.24	4.02
	Domestic use	0.82	0.73	0.72
	Farm price	-3.65	-3.89	-4.19
Wheat	Export	-0.23	-0.14	-0.53
	Domestic use	0.79	0.87	1.08
	Farm price	-3.86	-4.36	-5.08

Source: Journal of Agricultural Economics

Chapter 3 - Nigeria's Trade and Geographical Context

3.1 Nigeria's Tariff and Non-Tariff Barrier Before 2019

Before the 2019 land border closure, Nigeria implemented various tariff and non-tariff measures aimed at protecting and promoting domestic agricultural production. These measures were part of broader import substitution policies designed to reduce dependency on foreign agricultural products.

Rice: Nigeria imposed a 10% tariff and a 60% levy on imported rice, totaling a 70% duty for rice arriving through seaports. Additionally, rice imports via land borders were officially banned, although enforcement was challenging, leading to continued smuggling activities (USDA 2018).

Frozen Chicken: In the middle of 2015, a news outlet 'Frozen Food Biz (2015) reported that enforcement of the ban of the importation of frozen poultry products which has been in place since 2003 has intensified in 2015. This enforcement has contributed to a significant increase in poultry prices due to reduced availability.

Wheat: Wheat imports were subject to a 5% tariff and an additional 15% levy, amounting to a total duty of 20%. This policy aimed to encourage local wheat production, although domestic output remained insufficient to meet demand, leading to continued reliance on imports (Miller Magazine, 2025).

Cereal: Based on data from World Integrated Trade Solution (2019), Nigeria imported approximately 12.6 million kilograms of prepared cereals (excluding maize), valued at over $8 million. While specific tariff rates for cereals are not detailed, these imports were subject to the general tariff structure under the ECOWAS Common External Tariff, which imposed duties ranging from 0% to 35% depending on the product category.

In August 2019, Nigeria initiated a partial closure of its land borders, escalating to a complete shutdown by October 2019 (Al Jazeera, 2019). This policy aimed to curb smuggling activities, particularly rice and frozen poultry, which undermined domestic agricultural policies. The closure was intended to bolster local production by limiting illegal imports that bypassed official tariffs and bans.

3.2 Geographical Setting for Smuggling Between Benin, Togo and Nigeria

The development of entrepot trade can be seen among countries like Benin, Togo and The Gambia. These nations have deliberately maintained low import barriers and efficient port operations to reduce the cost of imports and transshipment, thereby attracting importers and smugglers engaged in cross-border trade (Stephen Golub, 2012). In the context of Nigeria, importers often utilize these neighboring states as transit points for legal trade due to their proximity. Nigeria's high protective tariffs, inefficient ports, and stringent currency controls create incentives for smuggling, with Benin, Togo, and Niger serving as key entry points for smuggled goods into Nigeria (Golub 2012).

Togo and Benin are members of the West African Economic and Monetary Union (WAEMU), a customs and monetary union that facilitates the free circulation of goods in transit within the region. Conversely, the Economic Community of West African States (ECOWAS) has faced challenges in fully implementing free trade agreements among its members, partly due to Nigeria's reluctance to liberalize certain protected industries, such as rice and petroleum products.

In 2000, WAEMU implemented the Common External Tariff (CET), establishing four tariff bands: 0% for essential social goods, 5% for basic raw materials, 10% for intermediate inputs and products, and 20% for consumer goods (Golub 2012). Building upon this, ECOWAS began

implementing its own CET in January 2015, introducing a fifth tariff band of 35% for specific goods aimed at economic development. This standardized tariff structure applies to imported goods across ECOWAS member states, with duties ranging from 0% to 35% depending on the nature and origin of the goods (EOWAS 2013)

Nigeria's tariff regime, aligned with the ECOWAS CET, comprises five bands: 0% duty on capital goods and essential drugs, 5% on raw materials, 10% on intermediate goods, 20% on finished goods, and 35% on goods in strategic sectors. Additional charges, such as levies, excise duties, and VAT, can increase the effective rate, though not exceeding the 70% limit set by ECOWAS. Exceptions exist for certain items, including luxury goods and vehicles (75%), alcohol and tobacco (95%), and strategic agricultural products like wheat (85%), sugar (75%), and rice (70%) (International Trade Administration 2023).

3.3 Cross Border Movement Between Benin, Togo and Nigeria

In 2013, Nigeria's tariff on rice imports was set at 70% while Benin reduced tariff on rice to 7%, making importing and re-exporting to become more attractive for smugglers (Woubet & Albert 2020). The usual practice by operators is to import rice to Benin at low cost and in turn smuggle them into Nigeria to sell at a much higher profit. Woubet & Albert (2020) spotted a huge gap between the population of Benin and the level of importation of rice, which suggest that most of the rice imported are not consumed domestically but rather re-exported through land borders to Nigeria.

There are two main types of transshipment that occur between Benin and Togo, depending on whether goods are classified as transit or re-export. When goods are declared for domestic use in Benin and Togo, the same goods are often smuggled into Nigeria. The protection in Nigeria is so high that smuggling remains lucrative even after paying the import duties in Benin and

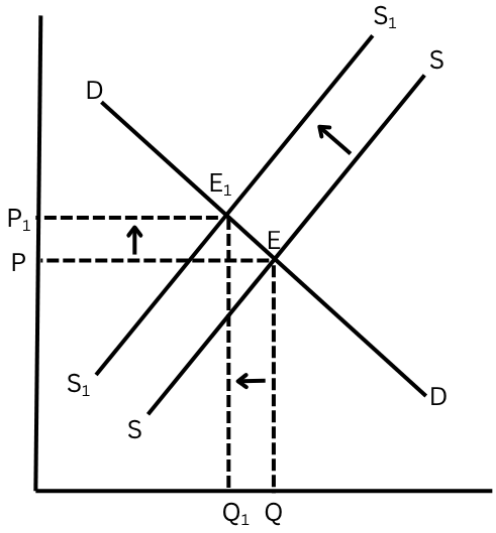
Togo. This pattern follows through for other products banned in Nigeria, such as frozen chicken and cloth, as well as goods facing high tariffs, such as rice (Golub 2012).

Interviews with customs officials and traders conducted in Benin in 2008 and Togo in 2009, it was revealed that large importing companies bring goods into ports of Benin and Togo to sell and smuggle to Nigeria even when declared for domestic use. For example, On-site visits by the author to car parks in Togo and Benin confirmed that buyers of vehicles are overwhelmingly Nigerian. Traders in Benin and Togo report that most other consumer goods imported in transit or re-export status wind up in Nigeria, particularly in the case of Benin. Various international and local press reports also report on observed smuggling from Benin and Togo to Nigeria (Golub 2012).

Chapter 4 - Conceptual Framework

Following the literature, I will think of the domestic market for rice as a competitive market. I will describe the competitive market through a demand for rice and a supply for rice. I assume that the market is small and has no market power. With the already existing high tariffs and an additional land border restriction, I assume that this will lead to a rise in the cost of rice such that every unit that will be supplied becomes more costly. Producers pass on this additional cost to consumers, leading to higher prices. I assume that it is the same people who import rice before and after, but now they cannot go through the land borders but must go through the sea which is regarded as the official importation route. This means that they are now exposed to the existing high tariff imposed by the government since the smuggling route has been cut off. Also, some importers might, because of the border closure, be taken out of the market which in that case creates a shortage in overall supply and might further contribute to a potential rise in the cost of goods.

Figure 4 - Supply Shift and Higher Price

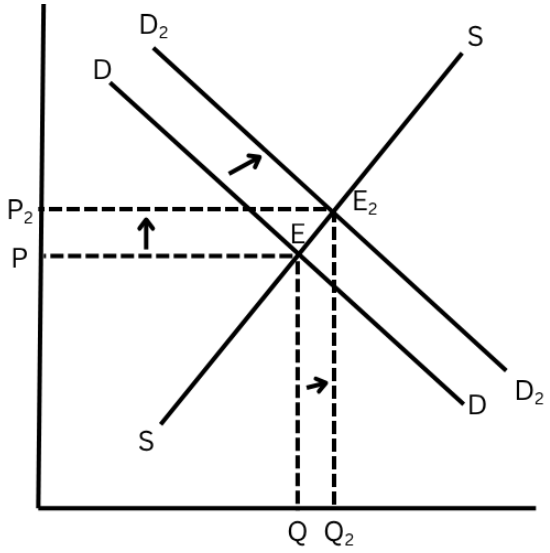


Source: Authors Own Work

In figure 5, the initial equilibrium position is captured at 'E', and the equilibrium price and quantity at 'P', Q respectively. Upon border restriction every unit becomes costly, leading to shortage in supply. The supply curve shifts inward to S_1, thereby we have a new equilibrium at

E_1. Suppliers pass on the cost to consumers in the form of higher price leading to a new equilibrium price and quantity at P_1 and Q_1 respectively.

Figure 5 - Demand Shift and Higher Prices



Source: Authors Own work

Similarly, if we think of the domestic market, following the restriction we assume that the disruption of imported products should stimulate local demand, leading to increased demand for products produced locally. I assume that domestic production will increase in response to the rise in domestic demand. However, in the short run, if local production could not immediately meet demand, I assume that domestic price of rice will also increase. In figure 6, the initial equilibrium position is captured at E, and the equilibrium price and quantity at 'P' and 'Q' respectively. If domestic demand increases, demand shifts outward to D2. In response to increased demand, supply increases leading to a new equilibrium at E_2 and a corresponding equilibrium price and quantity at P_2 and Q_2 respectively.

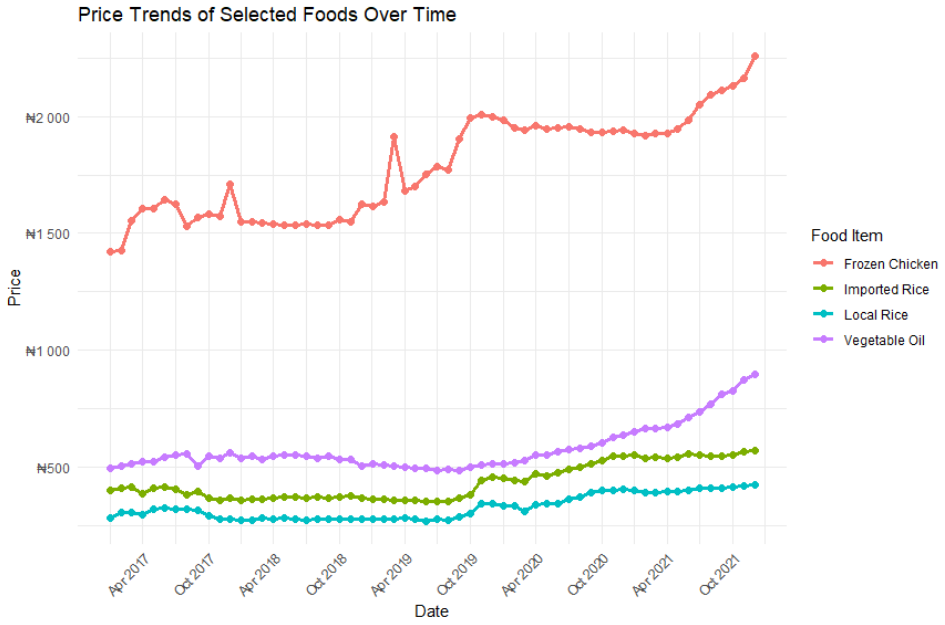
Chapter 5 - Empirical Analysis of Price Effects

This section identifies the source, scope and justification of data used in the study. It explains the methodology and presents the empirical findings of the analysis. It also provides specific insight into discussion of the results. Specifically, this chapter provides understanding of the policy effect on average food prices of products targeted by the policy. It also helps us to understand the effect of the policy on production volume for products mostly affected by the policy in general.

5.1 Data Description

The data used for this analysis is the national monthly average prices of selected food items from January 2017 to December 2021. This was obtained from the Nigerian National Bureau of Statistics (NBS), a statistical agency in charge of producing official statistics for the country. The data analyzed in this study is monthly data that provides information about how food prices changed after the implementation of the policy. It reveals monthly price of food two years before and two years after the policy was impleme

Figure 6: Price Trends of Selected Food Item



Source: Data from Nigeria Bureau of Statistics (NBS)

Before the closure, prices of frozen chicken fluctuated between 1,400 naira and 1,700 naira. After the closure, prices rose sharply to over 2000 naira and remain within that range for a while after which it continues upward. Prices of imported rice were relatively stable around 300 to 350 naira in years leading to the policy and rose sharply above 450 afterwards. Local rice was cheaper than imported rice and hovered around 250 to 350 naira for larger part before the policy and gradually transformed into an upward trend after the policy. Lastly, the price of vegetable oil was stable around 500 naira before closure and rose gradually but significantly to about 900 naira. This is suggestive evidence that the policy disrupted the supply chain for most of the products and possibly higher costs, which will then force an upward movement in the price of the products.

5.2 Methodology

Based on our data I used a **paired t-test** to evaluate **average price differences** for monthly data, comparing two years before the August 2019 land border closure (2017–2018) and two years after (2020–2021). This helps us to measure the **size of the difference** between the two sets of values (pre- and post-closure prices), **relative to the variation** in those differences. The partial year of 2019 was skipped to avoid contamination by transition months. I paired the monthly average for each month in the pre and post border closure.

A multiple linear regression model was constructed using monthly data from January 2017 to December 2021. This time frame allowed us to include two years before the closure (2017–2018) and two years after (2020–2021), while excluding 2019 to avoid potential transitional effects. To ensure consistency in units, the data was transformed as follows: the dependent variable, average food price, was transformed using natural logarithm to normalize its distribution and to allow percentage-based interpretation of coefficients. The exchange rate was also log-transformed for similar reasons, and the inflation rate was converted into portions divided by 100. This transformation ensures comparability across variables that are originally expressed in different units and scales.

5.2.1 Data Preparation and Variables

The regression dataset includes monthly national averages, with one observation per month. The dependent and independent variables were selected as follows:

- Dependent Variable:
    - Avg_Food_Price: The average retail price of selected food items per month. This variable captures overall food price movements.
- Independent Variables (Controls):

- YoY_Inflation: The year-on-year inflation rate, expressed as a percentage (%), obtained from national statistics. This is a control for general price level changes in the economy.
- ExchangeRate: The monthly average naira-to-USD exchange rate. This variable accounts for external price pressures and currency depreciation.
- BorderClosure: A binary (dummy) variable coded as 0 for all months before August 2019 and 1 for all months after. This captures the structural policy shock of the border closure.

5.2.2 Model Specification:

To estimate the impact of Nigeria's 2019 land border closure on food prices, I specified the following multiple linear regression model:

$$\text{Log}(\text{FoodPrice}_{t)} = \beta_0 + \beta_1 \cdot \text{Inflation}_t + \beta 2 \cdot \text{ExchangeRate}_t + \beta 3 \cdot \text{BorderClosure}_t + \varepsilon_t$$

Where:

- $\text{Log}(\text{FoodPrice}_{t)}$ = Natural logarithm of average food prices in month t
- Inflation_t = Year-on-year inflation rate (%) in month t
- ExchangeRate_t = Monthly average exchange rate (₦/USD) in month t
- BorderClosure_t = Dummy variable equal to 1 for months after August 2019 (i.e., post-border closure), and 0 otherwise
- β_1 = Intercept term
- $\beta 1, \beta 2, \beta 3$ = Coefficients to be estimated
- ε_t = Error term capturing unobserved factors

5.3 Empirical Results

5.3.1 Comparative Discussion of Average Prices

The paired t-test results show that **prices for all four key food products increased significantly** after 2019 land border closure, which was aimed at curbing smuggling and boosting domestic production (World Bank, 2020; Uba et al., 2022). The combined average result revealed a mean difference of 196.67 naira after border closure. This means that on average, prices increased by about ₦196.67 after the border closure. The t-statistics of 18.689 are large enough than what we would expect due to random chances, and the p-value is statistically significant at 0.000000001105. It suggests a strong difference between the pre- and post-border closure prices. There is strong evidence that prices increased significantly after the border closure.

Table 2: Average Monthly Prices for Pre (2017-2018) and Post (2020-2021) Closure Periods Paired by Month

Product	Mean Price Difference (₦)	t-Statistic	p-Value	95% Confidence Interval (₦)
Local Rice	92.62	-12.24	0.000000095	[-109.28, -75.96]
Imported Rice	138.46	-15.37	0.000000009	[-158.30, -118.63]
Frozen Chicken	431.64	-32.48	0.000000000003	[-460.89, -402.39]
Vegetable Oil	123.95	-7.19	0.000017753	[-161.89, -86.00]
All Products	196.67	-18.689	0.000000001105	[-173,51, -219.83]

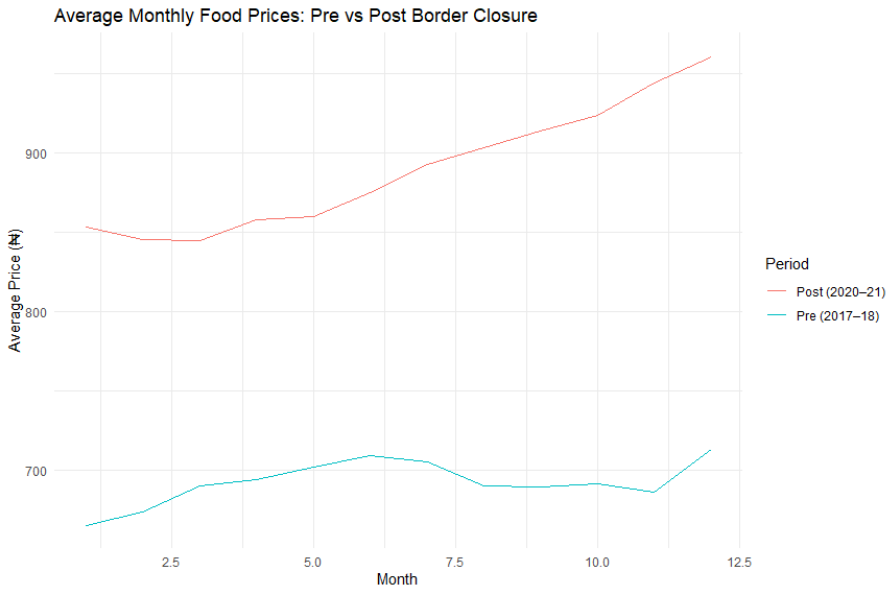
Source: All Price Data from NBS – Authors own calculations

The largest average price increase was observed in frozen chicken (₦431.64), followed by imported rice (₦138.46), vegetable oil (₦123.95), and local rice (₦92.62). All price increases were statistically significant at the 1% level, with extremely low p-values indicating a strong likelihood that these differences did not occur at random chance. These findings are consistent with the objectives of the Nigerian border closure, which was primarily aimed at curbing smuggling and promoting domestic agricultural production (Ayanwale & Amusa, 2021; Olomola, 2020). For example, the sharp increase in frozen chicken prices likely reflects the near-total dependence on imported poultry prior to the closure, combined with limited domestic capacity to substitute for lost imports in the short run (Uba et al., 2022). Similarly, the rise in imported rice prices demonstrates the border closure's immediate impact on restricting informal cross-border trade, particularly with neighboring Benin Republic, which had long served as a conduit for rice imports into Nigeria despite formal import bans (World Bank, 2020).

Interestingly, local rice prices also rose substantially, despite government efforts to promote domestic rice production through programs such as the Anchor Borrowers' Programme (Adeoye & Yusuf, 2021). The rise in local rice prices may reflect supply-side constraints such as inadequate milling capacity, poor storage infrastructure, limited access to credit, and climatic variability affecting production volumes (FAO, 2021). Increased demand for local rice, driven by the inaccessibility of cheaper imported alternatives, likely also contributed to higher prices (Ayanwale & Amusa, 2021).

The increase in vegetable oil prices highlights the broader vulnerability of Nigeria's food system to external shocks. Although Nigeria produces palm oil domestically, the country remains reliant on imports for other vegetable oils, which were disrupted by the closure. The resulting supply shortages likely led to higher prices (CBN, 2020).

Figure 7: Price Trends - Average Monthly Food Prices - Pre vs Post Border Closure



Source: NBS

As seen in figure 8, the empirical results suggest that the border closure played a significant role in driving food prices upward, it is crucial to recognize that other macroeconomic factors may also have contributed to these trends. For example, Adewuyi & Alege (2020); and CBN (2020) assert that the rising food prices in Nigeria can be attributed to the persistent depreciation of the Nigerian Naira combined with heavy dependence on import of both raw material and finished products. This rising cost also reflects on the prices of domestically produced goods due to imported inputs such as seeds, fertilizers, and machinery. There are also reports that Nigeria experienced rising food inflation of up to 22 percent in early 2021 fueled by energy prices and fiscal challenges (NBS, 2021). The border closure also met with Covid-19 pandemic leading to supply chain disruption and transport restriction (FAO, 2021; Otekunrin et al., 2021). The issue bordering on insecurity was also mentioned by Olomola (2020), as a key contributor, which has led to reduced domestic food production in key agricultural regions.

To account for this concern, a multiple linear regression model was constructed using monthly data from January 2017 to December 2021. This time frame allowed us to include two years

before the closure (2017–2018) and two years after (2020–2021), while excluding 2019 to avoid potential transitional effects.

5.3.2 Regression Estimate of Average Prices

Table 3: Empirical Results

Variable	Coefficient	Std. Error	t-Statistic	p-value	Significance
Intercept	-1.030	1.218	-0.846	0.402	
Inflation_Rate	-0.031	0.220	-0.142	0.888	
log_ExchangeRate	1.284	0.210	6.121	< 0.001	***
BorderClosure	0.146	0.019	7.827	< 0.001	***

Discussion of Results

Table 4 presents the results of the log-linear regression model. The findings indicate that the border closure policy significantly increased food prices by approximately 14.6% ($p < 0.001$), controlling for inflation and exchange rate movements. Exchange rate depreciation was also a significant determinant of food prices, with a 1% depreciation in the naira associated with a 1.28% increase in food prices ($p < 0.001$). Inflation, however, did not have a statistically significant independent effect on food prices ($p = 0.888$). The overall model fit is high, explaining 93.3% of the variation in food prices (Adjusted $R^2 = 0.929$).

The coefficient on the border closure dummy implies that food prices increased by approximately **14.6%** following the implementation of the border closure policy. This suggests that the closure significantly contributed to an upward pressure on domestic food prices. The exchange rate also exhibits a significant positive relationship with food prices. The estimated

elasticity of 1.284 ($p < 0.001$) indicates that a 1% depreciation of the Naira relative to the US Dollar is associated with a **1.28% increase in food prices**, holding other factors constant. This is consistent with the understanding that a weaker naira increases the cost of imported goods and raw materials, many of which are used in food production and distribution (Ogun, 2020; Adeniran et al., 2019). Contrary to expectations, the coefficient for year-on-year inflation was not statistically significant ($\beta = -0.031$, $p = 0.888$). This may reflect collinearity between inflation and exchange rate movements, or the fact that inflation being year-on-year, may not fully capture short-term price adjustments in food markets.

These findings are consistent with theoretical expectations from trade and price theory, which suggest that **border closures reduce the supply of tradable goods**, thereby pushing domestic prices upward (Krugman & Obstfeld, 2009). Similar outcomes have been reported in other contexts where trade restrictions led to immediate food price inflation (Akpan et al., 2014; Ulimwengu et al., 2012). Moreover, the significance of exchange rate effects reinforces studies that highlight the **import dependence of Nigeria's food system** and the vulnerability of domestic prices to currency shocks (Olayemi, 2016; World Bank, 2020). The Nigerian Naira depreciation and the resulting exchange rate further highlight the needs for sufficient domestic food production. One expectation is that if food products were sorted locally, food prices would cease to rise. While the border closure policy was partly justified to encourage local production and achieve food self-sufficiency, the results suggest that these objectives were not immediately realized. The evidence from the results shows that the policy fails to arrest the rising food prices but rather it led to further increase in price of products.

Chapter 6 - Empirical Analysis of Production Effect

Our model assumes that the policy will likely create a supply chain disruption and offset any pre-existing equilibrium. It is also expected to shift demand for affected products towards any variants which are available locally. I assume that people who demand imported rice before will be forced to look for local alternatives. This newfound additional demand for local products is expected to cause a rise in local production, especially for products that are targeted by the policy.

6.1 Data Description

The data used in this analysis is gotten from the Food and agricultural organization (FAO) of the United Nation. The list of products selected are items that are mostly affected by importation through the land border and products which are not affected by the policy. The affected products are listed into the treatment group and the least affected products are listed into the control group. The chosen periods for the study were nine years from 2015 to 2023, four years before 2015 – 2018 and four years after 2020 – 2023. The policy year was excluded as a transition year. I used the average production quantity for each chosen year to estimate the effect in production quantity before and after the policy.

Table 4: Selected Food Products

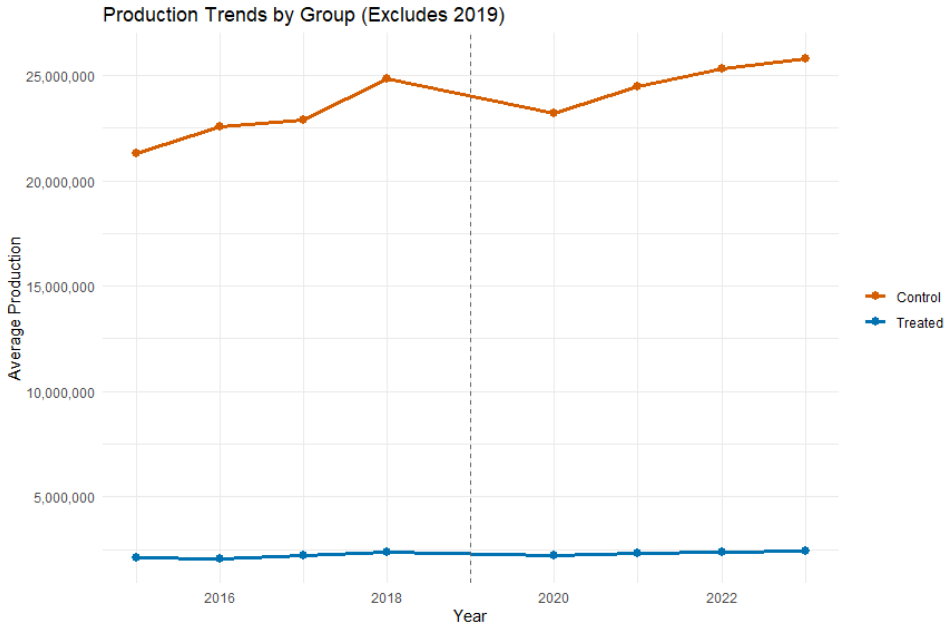
	Group	Products
1	Treatment	Rice Frozen chicken Fish and Sea food Vegetable oil Palm oil
2	Control	Cassava Yam Tomatoes Wheat Egg

Note: Grouping of items were done by the author and products are from the NBS Monthly selected Food Price Watch

6.2 Methodology

The method of analysis used in this section is a Difference-in-Difference (DiD) regression model that compares the quantity of products produced that faces border closure to those who do not face border closure before and after the policy. To better understand the impact, two regression models were estimated. We employ a Difference-in-Differences (DiD) framework. This method compares the changes in outcomes over time between treatment group (products affected by the border closure, such as rice, chicken, and vegetable oil) and a **control group** (unaffected products). To correct scale heterogeneity and ensure comparability across products, the dependent variable was transformed using the natural logarithm. This allows the treatment effect (β1) to be interpreted approximately as a percentage change in production. It also helps address potential heteroskedasticity, as larger production volumes typically exhibit greater variance.

Figure 8: Production Trends by Group (Excludes 2019)



Source: Our World in Data & FAO

6.2.1 Empirical Estimation

To estimate the causal impact of Nigeria's 2019 land border closure on domestic agricultural production, we begin with a baseline Difference-in-Differences (DiD) model. In this specification, we exclude the year 2019, which marked the policy implementation, to avoid contamination of the pre- and post-treatment periods. The post-treatment period is defined as 2020 onward, and the treatment group consists of products most directly affected by the policy (rice, chicken, and seafoods), while the control group includes unaffected products.

$$\text{Model 1: } \log(\text{Production})_{it} = \beta_0 + \beta_1 \text{Treatment}_i \times \text{PostClosure}_t + \epsilon_{it}$$

Where:

$\log(\text{Production})_{it}$: Natural logarithm of production for product i at time t.

Treatment_i : Dummy variable equal to 1 if product is in the treatment group, 0 otherwise.

PostClosure_t : Dummy variable equal to 1 for years after the border closure (2019 onward), 0 otherwise.

$\text{Treatment}_i \times \text{PostClosure}_t$: Interaction term capturing the DiD effect.

β_0 : The **intercept**; it captures the average production level of the **control group before** the border closure

β_1: The coefficient of interest—measuring the **causal impact of the border closure** on treated products.

ϵ_{it} : Error term.

Also, there is a concern because of the existing strength of the control group, where the average production was already higher, this suggests that there could be certain product specific factors that is causing the movement in the control group. Failing to control for these factors and other unobserved factors may bias the estimated treatment effect. The baseline model does not control for unobserved heterogeneity across products or time-specific shocks (such as inflation, climate variability, or national economic events) that may affect production independently of the border closure.

To address these limitations, I proceed to a more robust specification that incorporates product fixed effects and year fixed effects. The aim is to isolate the **true policy effect** of the border closure by controlling for time-invariant differences across products (e.g., inherent productivity or storage capacity), Common shocks across all products each year (e.g., macroeconomic policies, climatic conditions, or pandemic-related disruptions).

The regression model is specified as:

$$\text{Model 2: } \log(\text{Production})_{it} = \beta_1 \cdot (\text{Treatment}_i \times \text{PostClosure}_t) + \alpha i + \gamma_t + \epsilon_{it}$$

Where:

αi: Product fixed effects — absorb all time-invariant differences across products

γt: Year fixed effects — absorb any shocks or trends common to all products in a given year

β1: Difference-in-Differences (DiD) estimator, as before

- Other variables as defined earlier

6.3 Empirical Results

In the **baseline model**, the coefficient for Post x Treated is **−0.717**, indicating that, after the border closure, treated products experienced an estimated **71.7% decrease** in production, relative to control products and pre-policy trends. However, this effect is **not statistically significant** (p = 0.201).

In the **fixed effects model (with product and year fixed effects)**, the coefficient is estimated at **+0.118**, suggesting a modest increase of about **11.8%**, but again **not statistically significant** (p = 0.407)

Table 5: Empirical Results - Effects of Border Closure (Log Models)

	Baseline Model (log)	Fixed Effects Model (log)
(Intercept)	14.614***	
	(0.278)	
Post x Treated	-0.717	0.118
	(0.556)	(0.136)
Num.Obs.	80	80
R2	0.021	0.996
R2 Adj.	0.008	0.995
R2 Within		0.050
R2 Within Adj.		0.034
AIC	351.8	-64.4
BIC	356.6	-21.5
RMSE	2.13	0.13
Std.Errors	IID	by: Product
FE: Product		X
FE: Year		X

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

These findings suggest that after controlling for product-level and year-level effects, there is no robust statistical evidence that the border closure had a significant impact, either positive or negative on domestic agricultural production. There are several possible reasons for such an outcome. This result contradicts the policy objective of stimulating local agriculture through import restrictions. As reported by Adeniran et al. (2020) and World Bank (2021), a possible explanation is that the closure disrupted import-dependent supply chains and increased the cost of inputs such as feeds, seeds and machinery. Thereby indicating that the challenges may have outweighed any protective benefits in the short run. It could have the presence of **unobserved heterogeneity** or noise that affects different products differently. These findings are consistent

with prior studies that warn of **unintended consequences of trade restrictions** in the absence of adequate domestic infrastructure and support (Krugman & Obstfeld, 2009; Rodrik, 2018). Similarly, Goldberg and Pavcnik (2007) argue that trade interventions can produce distortions when domestic markets are underdeveloped or lack flexibility.

This result cautions against drawing strong causal conclusions on the effects of the policy. It also underscores a broader point made by Rodrik (2018) and others: **policy interventions can interact with structural constraints** in complex ways — and may not yield immediate or isolated effects when those constraints are binding (e.g., lack of capacity, infrastructure, credit access). Previous work by the World Bank (2021) also highlights that **import restrictions in the absence of strong domestic support policies** often fail to stimulate productivity and may even hurt sectors dependent on imported inputs. The lack of statistical significance estimates suggests that once we control for **product-specific characteristics and year effects**, the observed decline in production for treated products may be **driven by other trends or fixed product-level attributes**, rather than the border closure policy alone.

In the Nigeria context the result provides mixed evidence, it suggests that border closure at least in the short run did not have a significant impact on aggregate production across treated agricultural products. As reported by Ayanwale and Egwuma (2022), that the border closure led to rising food prices and market volatility, with limited evidence of increased domestic output. This poses strong evidence that while import bans may create incentives for domestic production, they can also reduce efficiency, inflate prices, and destabilize markets if implemented abruptly or without complementary reforms.

However, several Nigeria-specific factors help explain why the policy may not have led to immediate or significant increases in domestic production. Many agricultural producers in Nigeria rely heavily on imported inputs, the border closure might have affected critical inputs, potentially disrupting production capacity rather than enhancing it. There is also evidence that

smuggling might have continued through another route to further reduce the impact ofo the closure on domestic production (Adeniran et al., 2020).

Chapter 7 - Summary and Recommendations

7.1 Conclusion

This thesis explored the theoretical foundations, empirical outcomes, and policy implications of tariffs and trade restrictions, with a particular focus on Nigeria's 2019 land border closure. Drawing from classical and contemporary trade theories, the study engaged with the complex interplay between protectionism, domestic welfare, and international trade dynamics.

The theoretical framework reviewed foundational models, including Viner (1937), Meade (1955), and Johnson (1951), who demonstrated that while tariffs can sometimes improve welfare under certain conditions, they often lead to distortions in small open economies without market power. The optimal tariff theory, as advanced by Johnson (1951), emphasized that welfare-maximizing tariffs depend critically on the elasticity of foreign demand, while retaliation risks can quickly erode any gains. More recent models, such as Pin (2025) and Pal (2025), introduced the dynamic and network effects of tariffs, highlighting the broader global supply chain repercussions and delayed responses in economic variables.

Empirical literature, notably studies by Amiti et al. (2017) and Elobeid (2020), illustrated the real-world complexities of tariff implementation. The evidence from the US-China trade war indicated that tariffs raised consumer prices, triggered retaliatory actions, and restructured global trade flows, often undermining the intended benefits.

Focusing on Nigeria's 2019 land border closure, the empirical analysis provided robust evidence that the policy led to significant increases in domestic food prices. Paired t-tests and regression models confirmed that the closure raised average food prices by approximately ₦196.67. the regression estimation show that prices increased on average by 14.7 percent, after controlling for inflation and exchange rate movements. Furthermore, while the policy aimed to stimulate domestic agricultural production, Difference-in-Differences (DiD) analysis revealed a

significant decline in the production of key affected goods such as rice, frozen chicken, and seafood and the minor increase observed in the fixed effect turned out to be insignificant. This means that there was no strong evidence of the production increase. The lack of significant results is also a concern suggesting that the decline in production might have little or nothing to do with the policy been in place. There might be other plausible reasons responsible for such a decline in production which are not captured by this study.

These outcomes highlight that while tariffs and trade barriers may provide short-term revenue and protection for domestic industries, they also impose significant welfare costs on consumers. Its unintended consequence was a significant rise in food prices, exacerbating the cost of living for Nigerian households, and can fail to generate the anticipated supply-side responses without adequate domestic capacity and support structures. As Nigeria continues to pursue food security and self-sufficiency, policymakers must address persistent structural bottlenecks in agricultural production, including:

7.2 Policy Recommendations

Based on the findings of this study, the following policy recommendations are proposed:

Complementary Domestic Investment: Protectionist policies must be accompanied by substantial investment in domestic agricultural infrastructure, including storage, irrigation, transportation, and processing facilities, to enhance production capacities and mitigate supply shocks (Ayanwale & Egwuma, 2022; Goldberg & Pavcnik, 2007).

Selective and Temporary Protectionism: Any future use of tariffs or trade restrictions should be temporary and sector-specific, targeting industries with demonstrated potential for scalability and competitiveness. This approach would align with Johnson's (1951) optimum tariff theory while minimizing long-term welfare losses.

Exchange Rate Management: Given the significant impact of exchange rate depreciation on food prices, authorities should pursue more stable macroeconomic policies that curb inflationary pressures and maintain currency stability (Olayemi, 2016; Ogun, 2020).

Enhance Market Transparency and Competition: Efforts should be made to reduce information asymmetries, improve market access for farmers, and promote competitive pricing mechanisms to ensure that domestic producers respond effectively to changes in demand (Krugman & Obstfeld, 2009).

Appendices

Table 6: Descriptive Statistics Pre & Post Border Closure - Production in tonnes

Product	Period	Mean_Production	SD_Production	Observations
Cassava	Post	59,377,135.50	3,135,064.617	4
Cassava	Pre	61,158,993.50	3,270,883.749	4
Fish and SeaFood	Post	1,075,843.75	21,802.469	4
Fish and SeaFood	Pre	1,112,250.00	92,222.105	4
Frozen Chicken	Post	335,149.56	16,991.028	4
Frozen Chicken	Pre	244,259.14	30,093.048	4
Palm Oil	Post	1,348,625.50	57,220.832	4
Palm Oil	Pre	1,371,504.25	279,998.674	4
Rice	Post	8,479,500.00	312,392.424	4
Rice	Pre	7,906,000.00	352,020.501	4
Tomatoes	Post	3,568,133.25	179,172.308	4
Tomatoes	Pre	3,151,975.00	728,997.699	4
Vegetable Oil	Post	365,403.12	8,779.666	4
Vegetable Oil	Pre	342,075.00	18,753.911	4
Wheat	Post	44,782.04	10,593.498	4
Wheat	Pre	72,780.00	14,933.363	4
Yam	Post	59,883,282.50	2,511,081.240	4
Yam	Pre	49,492,405.00	4,610,575.067	4
egg	Post	669,340.26	27,445.306	4
egg	Pre	652,500.00	9,574.271	4

Table 7: Combine Average Monthly Price of Selected Food Item Pre and Post policy

Group	Mean	Median	SD	Min	Max	IQR
Post	889.522	883.8414	39.68324	844.6226	960.6325	59.11112
Pre	692.8543	691.0035	13.82005	665.8021	713.5091	13.66582

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