



Does Qurban Improve Smallholder Welfare? A Difference in Differences Analysis of Livestock Farmers in Indonesia

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Abstract. This study examines the economic implications of qurban for small scale livestock farmers in Indonesia, where the annual Eid al-Adha ritual generates substantial demand for sacrificial animals. Despite its significant economic potential, the distributional effects of qurban on farmer welfare remain unclear. This study aims to evaluate whether increased sacrificial slaughter contributes to improvements in the welfare of smallholder farmers. Employing a quantitative approach with a Difference in Differences (DiD) model and panel data from 32 provinces over the 2017–2021 period, farmer welfare is proxied by the Farmer Exchange Rate Index (NTPT), while sacrificial activity is measured by the number of animals slaughtered inside and outside official slaughterhouses (RPH). The findings indicate that, although NTPT generally increases after Eid al-Adha, the DiD estimates are statistically insignificant, suggesting that qurban does not exert a distinct welfare effect on small farmers. Slaughter conducted through RPHs tends to involve large intermediaries, limiting benefit transmission, while community based slaughter outside RPH shows greater potential for local economic inclusion. Inflation further attenuates real welfare gains. This study provides empirical evidence on the distributive limitations of religious economic activities and highlights the need for more inclusive supply chain policies.

Keywords: Qurban; Rural Welfare; Livestock Sector; Difference in Differences Analysis.

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INTRODUCTION

Livestock farming constitutes a significant sub-sector of Indonesia's agricultural economy, contributing to rural employment, income generation, and national economic growth. Beyond large scale commercial enterprises, the sector is predominantly sustained by small traditional farmers dispersed across rural areas. Data from the 2013 livestock census indicate that farming households in Indonesia reached 13.56 million (BPS, 2013), underscoring the sector's socioeconomic importance. Within this context, the ritual of qurban during Eid al-Adha holds

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not only spiritual value but also substantial social and economic implications. Each year, Muslims slaughter cattle, goats, and sheep as a religious obligation aimed at spiritual devotion and social solidarity. Beyond its devotional dimension, qurban facilitates meat redistribution to vulnerable communities, thereby strengthening social welfare functions within Islamic society (Siregar & Nasution, 2024). Consequently, qurban represents a unique intersection between religious practice and rural economic activity.

From an economic standpoint, qurban triggers a sharp, short lived jump in demand within Indonesia's livestock markets. Data from the Directorate General of Livestock and Animal Health Services, Ministry of Agriculture (2021), show that national slaughter volumes climbed from 16.4 million head in 2017 to 18.1 million head in 2021, evidence of a livestock market that keeps expanding. Especially in quarter overlapping with Eid al Adha, sacrificial animal slaughter climbs sharply year on year (BPS, 2024). For livestock farmers, this seasonal spike represents a real chance to earn additional income. Yet such surges also call for supply side responses to match, absent proper coordination, they can just as easily tip into supply demand mismatches and unchecked price spikes that destabilize the market (Sudibyo et al, 2018; Abidin et al, 2024; Siregar & Nasution, 2024).

The Eid al Adha phenomena could be seen from supply and demand theory that such a recurring seasonal jump in demand should lift producer income and welfare via higher prices and greater market activity (Mankiw, 2021b). However, empirical evidence indicates that small scale livestock farmers do not always fully realize these expected welfare gains due to market inefficiencies, the presence of numerous intermediaries, limited bargaining power, and the unequal distribution of value along the supply chain (Daulay et al, 2020; Abidin et al, 2024; Siregar & Nasution, 2024). Therefore, empirical verification is required to determine whether qurban serves merely as a source of expanded seasonal demand or as an effective instrument for enhancing rural welfare.

Existing literature on qurban predominantly examines supply chain dynamics rather than direct welfare outcomes. Abidin et al. (2024) analyze financial innovations within integrated supply chain management to address capital and marketing constraints in smallholder livestock businesses. Daulay et al. (2020) highlight how extended marketing channels elevate selling prices and margins, while Hidayat and Munshi (2019) focus on optimizing meat distribution systems. Further, Zakiyah (2011) discussed how Islamic welfare practices contribute to rural development. In general, these studies indicate that qurban trade yields significant economic

benefits. However, the research tends to focus more on institutional arrangements, marketing mechanisms, or the outcomes of specific cases. Consequently, there is a lack of evidence regarding whether the expansion of qurban activities lead into measurable welfare improvements for small scale livestock farmers across a broader area. In addition, previous studies have employed descriptive, qualitative, or cross sectional methods, which provide limited evidence for establishing causal relationships. Therefore, a robust empirical assessment utilizing quasi experimental methods remains lacking.

Based on these limitations, three significant research gaps can be identified. First, existing evidence on the impact of qurban on welfare remains limited, especially at the broader regional level. Second, most previous studies have relied on descriptive, qualitative, or cross sectional approaches, which are less suitable for identifying causal relationships between qurban activities and livestock farmer welfare. Third, quasi experimental evaluations using provincial panel data to estimate the causal impact of qurban on welfare are still rare in the Indonesian context. Closing these gaps matters for settling a basic question: does Qurban function only as a seasonal jolt to demand, or can it genuinely serve as a tool for lifting rural livelihoods?

The Institute for Demographic and Affluence Studies (IDEAS, 2020) estimates that qurban in Indonesia generated approximately Rp 28.2 trillion, with participation from around 2.16 million donors. Despite this significant economic magnitude, benefit distribution remains uneven. Farmers frequently sell livestock prior to Eid al-Adha at relatively low prices to middlemen, who subsequently resell at higher margins (Mais & Abidin, 2021). Limited access to capital, market information, and formal distribution channels weakens farmers' bargaining positions. These conditions indicate that the benefits derived from qurban may not be evenly distributed among market participants. Therefore, an empirical evaluation is needed to determine whether the expansion of qurban activities genuinely improves farmers' welfare or whether the economic benefits remain concentrated among other actors in the supply chain.

In light of these research gaps, this study aims to analyze the impact of qurban activities on the welfare of small scale livestock farmers in Indonesia. To obtain more robust causal estimates than those yielded by descriptive or cross sectional approaches, the study employs the Difference in Differences (DiD) method to estimate the causal impact of qurban activities. The results indicate that the increase in qurban activities has not yet had a significant impact on the welfare of small-scale farmers at the provincial level after controlling for inflation. These findings contribute empirically to the literature on the economics of qurban, expand the

application of quasi-experimental methods in Islamic economic research, and provide policy implications for enhancing the effectiveness of qurban as instrument for improving the welfare of small scale farmers.

LITERATURE REVIEW

Previous Studies

Research on the economics of qurban has primarily focused on institutional and supply chain dimensions rather than direct welfare impacts. Existing studies examine financial and managerial innovations within livestock distribution systems. For instance, Abidin et al. (2024) analyze financial innovations in integrated supply chain management (ISCM) to address capital and marketing constraints faced by smallholder farmers. Daulay et al. (2020) demonstrate that extended marketing channels increase selling prices through higher marketing margins, while Hidayat and Munshi (2019) propose information system improvements to optimize sacrificial meat distribution. From a normative welfare perspective, Zakiyah (2011) discusses Islamic welfare systems in rural contexts, including qurban as a redistributive instrument. However, despite these contributions, prior research has not empirically evaluated whether increased sacrificial activity produces measurable improvements in small scale farmer welfare, revealing a significant empirical gap.

Beyond supply chain mechanisms, qurban has been widely examined from a social welfare and public health perspective. The distribution of sacrificial meat increases protein intake among vulnerable populations and contributes positively to nutritional outcomes. Abdullah (2024). emphasizes its importance for communities with limited access to animal protein, particularly children and elderly populations. Empirical studies further document improvements in nutritional status (Lalu, 2020; Hadju et al., 2023; Ajiputri et al., 2023) and anthropometric indicators such as height and weight (Anton et al., 2022; Sidiq et al., 2022; Andriani et al., 2023; Wiyono, 2023; Saefullah et al., 2023). While these findings highlight the social and health benefits of qurban, they do not address its economic impact on producers. Consequently, the producer side welfare dimension, particularly for smallholder livestock farmers, remains insufficiently explored within existing scholarship.

The economic magnitude of qurban further justifies rigorous impact assessment. IDEAS (2020) estimates that qurban mobilizes approximately Rp20.5 trillion annually, involving millions of donors and significant livestock demand. In theory, such seasonal demand expansion should

increase producer income. However, Mais and Abidin (2021) argue that profits are disproportionately captured by upstream moneylenders and downstream intermediaries, while small farmers receive relatively limited gains due to restricted market access. Structural rural constraints reinforce this imbalance. Indonesia's dispersed village structure and limited institutional access exacerbate dependence on informal lenders (Rinda & Aminda, 2020) and wholesalers (Elysia et al., 2016). Moreover, Abidin et al. (2024) emphasize the dominance of intermediaries in shaping distribution outcomes. These structural conditions suggest that demand growth alone may not guarantee equitable welfare improvements for small scale farmers.

A review of existing research on qurban has predominantly focused on theological perspectives, institutional management, supply chain efficiency, meat distribution, consumer behavior, and socio-economic impacts at the community level. However research on the welfare of small scale rural livestock farmers, specifically analyzed using the Difference in Differences (DiD) method has not yet been addressed; thus, the novelty of this study lies in these two aspects.

Theoretical Frameworks

Word choice in this literature tracks disciplinary and regional lines more than it reflects mere linguistic preference. Islamic jurisprudence and Sharia scholarship favor the term *udhiyah*, the classical legal label rooted in Arabic *fiqh*, (Kahf, 2003). South Asian scholarship, by contrast, tends toward *Qurbani* when examining the socio economic, cultural, and charitable dimensions of Eid al-Adha, as in (Borchgrevink, 2026). Indonesian and Malaysian publications especially in Islamic philanthropy, nonprofit management, and community empowerment research commonly settle on *qurban*, as seen in (Basyir, 2024; Muslim et al., 2023; Salleh et al., 2023). Outside Islamic studies altogether, anthropologists and comparative-religion scholars reach for the broader label *animal sacrifice* when comparing rituals across faiths, while veterinary science, animal welfare, and food science research use *sacrificial animals* when discussing livestock quality, slaughter practice, meat hygiene, and halal processing (Farouk et al., 2014).

Qurban and Trickle Down Effect

The trickle down effect theory is an economic theory which states that the economic benefits received by high income groups, business actors, or certain sectors will eventually trickle down to the wider community through increased investment, job creation, increased income, and economic growth. The theory posits that economic gains at higher market levels should diffuse

to lower-level actors (Hirschman, 2012). Within the qurban supply chain, increased consumer demand theoretically generates price incentives that benefit producers. However, empirical evidence challenges this assumption. Siregar and Nasution (2024) report that small farmers experience income increases of only 20 - 30 percent during the sacrificial season, whereas large traders capture up to 70 percent of final margins. This disparity indicates imperfect transmission mechanisms within the market structure. If demand shocks induced by religious rituals do not proportionally enhance smallholder welfare, then structural inefficiencies may inhibit the trickle-down process. Therefore, assessing whether qurban operates as an inclusive economic instrument requires empirical verification using measurable welfare indicators.

In addition to market structure, production cost dynamics significantly shape farmer welfare. Feed constitutes one of the largest cost components in livestock production, directly influencing profitability (BPS, 2024). Siregar and Nasution, (2024) emphasize that production efficiency is highly sensitive to external cost factors, particularly feed prices. The Ministry of Agriculture of the Republic of Indonesia (2024) reports that feed prices have increased by 15 - 25 percent annually over the past five years, intensifying cost pressures on small farmers. Kurniawan et al. (2025) further confirm that feed price volatility significantly affects livestock productivity and profit margins. Rising production costs may offset revenue gains from higher seasonal livestock prices. Consequently, welfare outcomes depend not only on demand increases but also on cost stability, necessitating a broader analytical framework that integrates both revenue and expenditure dimensions.

Inflation drives increases in feed and input prices, thereby affecting the Farmer Exchange Rate and reducing real income (Firmansyah et al., 2024). Rising production costs may threaten the sustainability of small enterprises, as noted by Alamsyah et al. (2021). Within livestock production, feed represents a fundamental input; thus, inflationary pressures can erode purchasing power and compress margins. This macroeconomic mechanism suggests that nominal income growth during the qurban season may not translate into real welfare improvements. Accordingly, inflation must be incorporated as a control variable in empirical evaluation to isolate the net welfare effect of sacrificial demand shocks.

The qurban demand in Eid al-Adha every year could be seen from the trickle-down as a mechanism through which economic benefits generated by religious activities are transmitted to upstream economic actors, particularly livestock farmers. Unlike the conventional trickle-down theory, which emphasizes the redistribution of economic gains from high-income groups

to lower-income groups, the trickle-down mechanism associated qurban can be understood as a sequential causal process. First, increased community participation in qurban creates a substantial rise in the demand for sacrificial animals. Second, this increase in demand leads to adjustments in market prices and trading volumes, thereby enhancing livestock farmers' revenues. Third, higher farm income strengthens farmers' purchasing power, encourages productive investment, and expands their production capacity in subsequent production cycles.

Qurban and Farmer Welfare

Welfare economics theory (Pigou, 2017) discusses how resource distribution can improve social welfare. In the context of this research, this theory can be used to analyze whether the distribution policy for the qurban ritual has contributed to improving the welfare of smallholder farmers or has actually strengthened the dominance of large businesses. Akerlof (1990) said markets often experience information asymmetry, where one party has more information than the other. In the livestock context, smallholder farmers often have limited access to information on market prices, demand, and policies related to qurban. This weakens their bargaining position compared to large traders, leading them to tend to sell livestock at lower prices.

Social welfare is a system that reflects improvements in people's living standards. Social welfare can be achieved through various social policies and programs (Midgley, 1995). Social welfare also describes a state that describes a balance in the economic, social, and psychological aspects of both individuals and society (Friedman, 2020). In the context of this research, various policies related to qurban should serve as a means of social programs that can improve the standard of living of the community, in this case small-scale livestock farmers. This can be achieved through mechanisms for setting affordable feed prices and policies that can increase the interest of qurban administrators, including zakat and social institutions, as well as mosque administrators, in purchasing sacrificial animals from small-scale livestock farmers.

Social welfare is an organized system of various services and efforts from social institutions, designed to help individuals and community groups improve their desired standard of living. Furthermore, the development of personal and social relationships provides opportunities for individuals to continuously develop, expand their capabilities to the fullest, and improve their welfare in accordance with community needs (Wilensky & Lebeaux, 1965). Social policy is part of the social welfare system. The social welfare system consists of various organized efforts and structures aimed at improving community welfare (Segal, 1998). In this regard,

considering the strategic position of zakat and social institutions, as well as mosque administrators, in purchasing sacrificial animals. The institution that manages sacrificial animals allows for the building of personal and social relationships as a philanthropic institution that can provide services and efforts to encourage the development and improvement of livestock breeder welfare by prioritizing the purchase of sacrificial animals from small livestock breeders at a reasonable price.

Conceptual Frameworks

Drawing on this literature, the study treats seasonal Qurban demand as an external market stimulus expected to lift farmer welfare through higher livestock sales, a relationship the Trickle-Down Effect frames as consumer spending flowing down the value chain to producers. How well that transmission actually works, though, should depend on market structure and institutional efficiency, while production costs, especially on feed price. Inflation can shrink any welfare gain by raising expenses and eroding real purchasing power. Farmer welfare, in this framing, emerges from the balance between demand-side gains and cost-side pressures as seen at Figure 1 below.

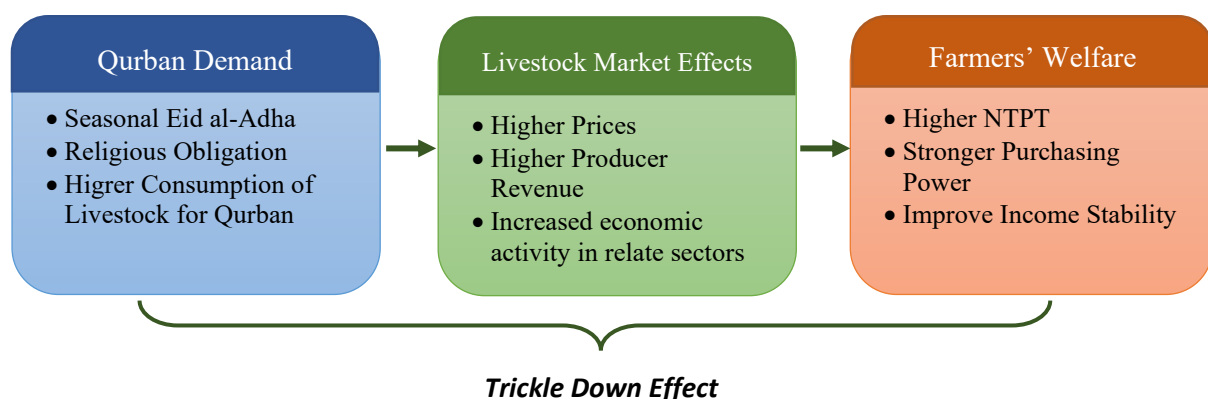


Figure 1. Conceptual Model of the Trickle Down Effect in Indonesia

METHOD

This study addresses causal inference to estimate the impact of increased qurban slaughtering intensity on livestock farmer welfare. Counterfactual scenarios are required, namely the level of welfare that livestock farmers would have experienced had the increase not occurred during the same period. These counterfactual scenarios are not directly observable, and changes in welfare are simultaneously influenced by other factors, including livestock price fluctuations, macroeconomic conditions, seasonality, and the specific characteristics of each province. For

this reason, neither conventional regression models nor simple before and after comparisons are sufficient to isolate welfare effects attributable to changes in qurban slaughtering intensity.

To address this challenge, the study employs a Difference in Differences (DiD) approach, comparing changes in welfare over time between provinces that experienced a relatively large increase in the intensity of sacrificial slaughter and those with a smaller increase. The treatment group consists of provinces that recorded an increase in sacrificial slaughter of more than 50 percent compared to the previous quarter, while the remaining provinces serve as the comparison group. By comparing changes in outcomes for the treatment group against similar changes in the comparison group, the DiD method eliminates common shocks affecting both groups during the same period and provides a more accurate estimate of the causal impact of the increase in slaughter intensity, based on the parallel trends assumption.

This analysis utilizes province level panel data sourced from Statistics Indonesia (BPS), the Ministry of Agriculture, and IDEAS, with estimations performed using Stata software. The DiD specification employed incorporates province and year fixed effects to control for time invariant, unobserved provincial characteristics and macroeconomic shocks affecting all provinces; meanwhile, inflation is included as a time varying control variable, given its influence on livestock production costs and farmers' purchasing power. Based on the parallel trends assumption, this specification identifies the impact of increased sacrificial animal slaughter intensity on welfare by comparing outcome changes between treatment and comparison provinces during the periods before and after Eid al-Adha.

The unit of analysis is the province, with quarterly observational data forming a balanced panel dataset for the 2017–2021 period. The dataset includes the Farmer Exchange Rate for Livestock Farmers (NTPT) as a proxy for smallholder welfare (BPS, 2013). The use of NTPT as a welfare indicator is supported by Kustiari et al. (2020) and Hadi et al. (2018), who identify it as a reliable measure of farmers' purchasing power and income stability. The number of sacrificial animals slaughtered in each province, obtained from IDEAS and the Ministry of Agriculture. Provincial level slaughter statistics are used as a proxy indicator for qurban activities, as direct data on qurban participation at the provincial level is unavailable. Provincial inflation rates sourced from BPS.

Table 1. Variable and Measurement

Variable	Variable Definition	Measurement Unit	Data Source
Qurban	A dummy variable equal to 1 for provinces experiencing an increase of more than 50% in the number of <i>qurban</i> animal slaughters compared to the previous quarter, and 0 otherwise.	Dummy	Statistics Indonesia (BPS)
Idkuartal (Eid al-Adha Quarter)	A dummy variable identifies the quarter that includes the Eid al-Adha period and the associated qurban animal slaughter. The variable takes the value of 1 if an observation falls within the quarter containing Eid al-Adha, and 0 otherwise.	Dummy	
NTPT	Farmers' Terms of Trade Index for the Livestock Subsector.	Index (2018=100)	Statistics Indonesia (BPS)

Table 1, farmer welfare is operationalized using quarterly NTPT data published in the Livestock and Animal Health Statistics of the Ministry of Agriculture. NTPT reflects the ratio between the price index received by livestock farmers (It) and the price index paid by farmers (Ib) for household consumption and production inputs. A higher NTPT indicates improved purchasing power and economic welfare. Quarterly data are used to capture seasonal economic dynamics surrounding Eid al-Adha, as livestock trading activity intensifies several weeks prior to the ritual, not only during the slaughter period itself.

The level of qurban participation is proxied by provincial livestock slaughter statistics published by BPS. This proxy is justified by the consistent surge in slaughter numbers during quarters that include Eid al-Adha, reflecting heightened sacrificial demand. The 2017–2021 period is selected due to the availability of disaggregated data distinguishing livestock slaughter conducted in official slaughterhouses (RPH) and outside such facilities. This distinction is crucial for identifying differences in market structure and participation channels. Inflation data for the same period are incorporated to account for macroeconomic cost pressures affecting livestock production.

Two alternative treatment specifications are estimated to test whether the estimated welfare impacts differ depending on the definition of qurban slaughter activities. The first model uses total livestock slaughter (both inside and outside RPH), capturing the overall market response to sacrificial demand (Model 1). Slaughter conducted within RPH may indicate the

involvement of larger scale traders or commercial actors. The second model focuses exclusively on livestock slaughter outside RPH (Model 2). This specification aims to better capture community based sacrificial practices, which are typically organized in mosques or local neighborhoods and are more likely to source animals directly from small scale farmers. Comparing these models enables assessment of whether welfare effects differ across distribution channels.

The econometric specification applies a DiD estimator with provincial (individual) fixed effects and time fixed effects. Provincial fixed effects control for time invariant heterogeneity across provinces, while time fixed effects capture common macroeconomic shocks affecting all provinces simultaneously. Inflation is included as a control variable to account for price level changes that may influence real welfare outcomes. The baseline estimation model is specified as follows:

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) + \gamma_i + \delta_t + \varepsilon_{it} \dots\dots\dots (1)$$

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) + \gamma_i + \delta_t + \beta_4 X_{it} + \varepsilon_{it} \dots\dots\dots (2)$$

Y_{it} is the outcome in this study, namely the welfare of small-scale farmers. The $Treat$ variable ($Treat_i$) is a dummy variable for provinces with growth in sacrificial slaughter (>50% = 1, < 50% = 0). Post Variable ($Post_t$) is a dummy variable for the period before and after Eid al-Adha. The interaction variable ($Treat_i \times Post_t$) measures the impact of sacrificial slaughter, Individual Fixed Effects (γ_i) control for differences in characteristics between farmers that do not change during the observation period, while Time Fixed Effects (δ_t) control for time effects that affect the entire population. Furthermore, the Inflation variable (X_{it}) is a control variable that also affects farmer welfare.

Province fixed effects control for time-invariant provincial characteristics that may influence farmers' welfare, while year fixed effects account for macroeconomic shocks common to all provinces. To strengthen the credibility of the Difference in Differences estimates, additional diagnostic analyses were conducted, including parallel trends, a placebo test and robustness checks.

RESULTS

The variables used in this study are farmer welfare and the level of participation in qurban on Eid al-Adha. Farmer welfare is proxied using data on the Livestock Farmers' Terms of Trade

Index (NTPT) in the Livestock and Animal Health Statistics issued by the Ministry of Agriculture of the Republic of Indonesia. The NTPT measures the ratio of the price index received by livestock farmers (It) to the price index paid by livestock farmers (Ib) for household consumption needs and livestock production requirements. The NTPT data used is quarterly. This is because economic activity in anticipation of Eid al-Adha does not only occur during the sacrifice ritual, but economic activity has already begun several weeks before the holiday. The variable of qurban participation rate is proxied using data on the number of livestock slaughtered, as published by the Central Statistics Agency (BPS) of the Republic of Indonesia. The use of this data to proxy the level of participation in qurban worship is based on the upward trend in the number of livestock slaughtered, which increases significantly in each quarter that includes the Eid al-Adha holiday, namely in the third quarter (Q3).

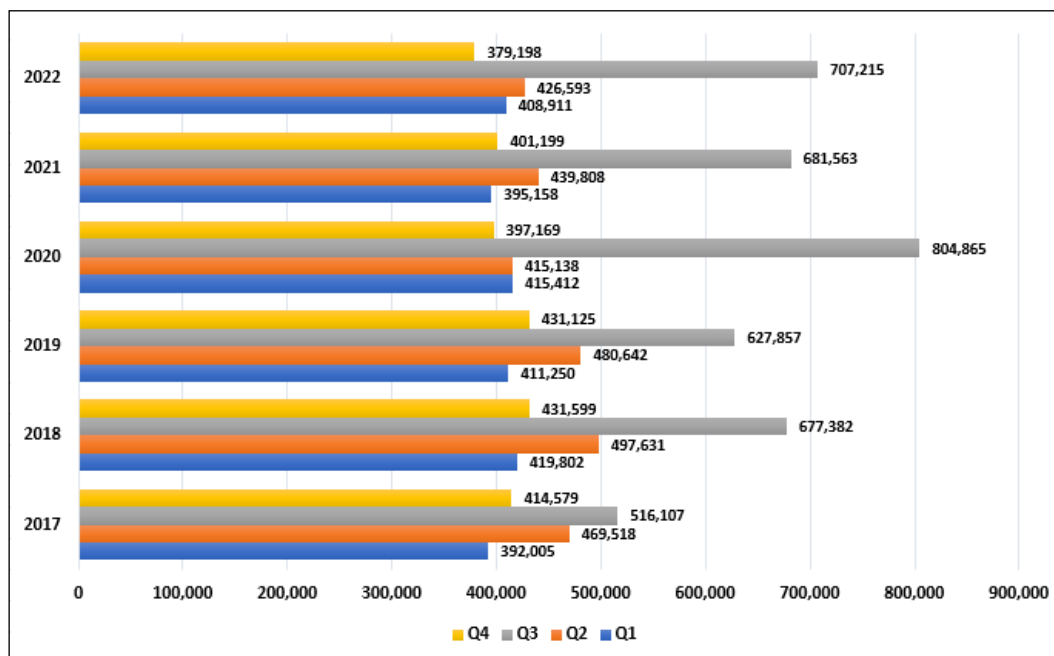


Figure 2. Number of Livestock Slaughtered

This study uses data from 32 provinces in Indonesia. The livestock data used in this study are animals permitted under Islamic sharia law to be used as sacrificial animals, namely cattle, buffalo, goats, and sheep. The data used in this study are from the 2017-2021 period. This period was chosen due to the availability of data published by the relevant institutions, namely data that separates the number of livestock slaughtered in slaughterhouses (RPH) and outside RPH. This separation was not found in statistics from previous periods. Meanwhile, data after 2021 is not yet available (Figure 2).

The separation of data between animal slaughter in slaughterhouses and outside slaughterhouses is important because Indonesians typically perform their qurban rituals in mosques or villages where they live. In this study, this can be demonstrated by the number of livestock slaughtered outside slaughterhouses. When viewed in detail, Figure 3 shows that livestock slaughtering carried out in RPH has decreased each year. Conversely, the number of livestock slaughtered outside slaughterhouses has increased each year. This indicates that the welfare of small farmers should also improve in line with the increase in the number of livestock slaughtered outside RPH.

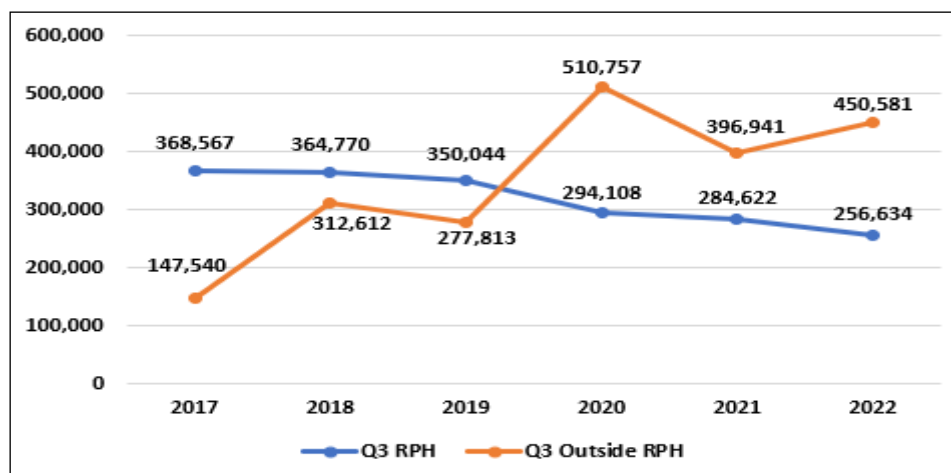


Figure 3. Slaughtering of Q3 livestock

Figures 4 show the number of sacrificial animals slaughtered in the quarter before the sacrificial period (Q2) and during the sacrificial period (Q3). Figure 4 shows that the number of sacrificial animals slaughtered in RPH for the quarter before the sacrificial period was higher and decreased each year. A different situation occurs with livestock slaughter outside RPH, which has increased significantly compared to the previous quarter and has shown an upward trend each year. This indicates that the welfare of small farmers should also have improved.

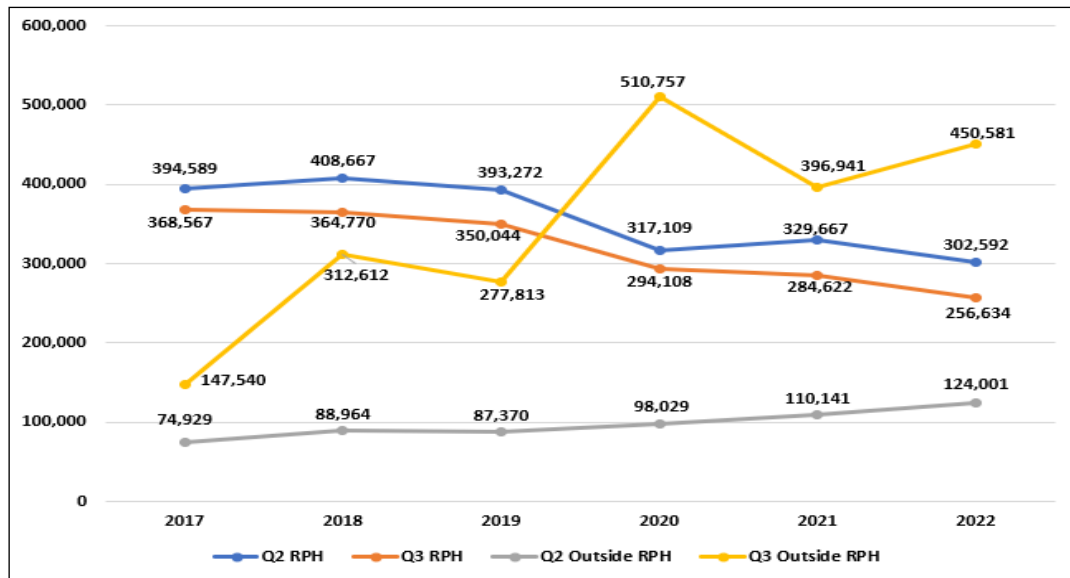


Figure 4. Comparison of Q2 and Q3 in RPH and outside of RPH

To examine the relationship between the slaughter of qurban animals and livestock farmers' welfare, this analysis employs two complementary treatment specifications. The first specification captures the broader impact of an increase in sacrificial animal slaughter defined as a rise of more than 50% in the number of animals slaughtered compared to the previous quarter (Model 1). This specification aims to identify whether a substantial increase in slaughter activity linked to the sacrificial period correlates with changes in farmers' welfare, regardless of the slaughter location. The second specification focuses specifically on sacrificial animals slaughtered outside official slaughterhouses (Model 2). This distinction is relevant because slaughter outside slaughterhouses may reflect a different channel through which the sacrificial period affects farmers particularly regarding the direct involvement of local livestock markets and farmers in the supply of sacrificial animals. By examining these two specifications separately, the analysis provides both a broader assessment of the welfare implications of increased sacrificial slaughter activity and a more specific evaluation of the potential role of slaughter occurring outside formal slaughterhouse facilities.

Model 1. Overall Qurban Animal Slaughter

The first section examines the relationship between the significant increase in the slaughter of sacrificial animals and the welfare of livestock farmers. Before presenting the Difference in Differences estimation results, the following descriptive statistics summarize the sample composition for the treatment and comparison groups across both observation periods. Table 2 presents sample composition and descriptive statistics utilized in the DiD analysis for overall qurban animal slaughter.

Table 2. Sample Composition and Descriptive Statistics
for Overall Qurban Animal Slaughter

Panel A. Sample Composition by Treatment Group and Period					
Qurban	Non Eid al-Adha Quarter (idkuartal =0)	Non Eid al-Adha Quarter (idkuartal =0)	Total		
0 (Control Group)	108	106	214		
1 (Treatment Group)	52	54	106		
Total	160	160	320		
Panel B. Descriptive Statistics of the Outcome Variable					
NTPT	Obs.	Mean	Std. Dev	Min	Max
	320	103.7486	6.6521	90.83	133.54

Source: Author's calculations based on the 2025 dataset

The dataset consists 320 observations, evenly distributed between non Eid al-Adha quarters and quarters containing the Eid al-Adha period, totaling 160 observations for each period. According to how the treatment is categorized, 106 observations (33. 13%) are from regions that saw over a 50% rise in qurban animal slaughters in comparison to the previous quarter, while the other 214 observations (66. 88%) are classified in the comparison group. The distribution of the sample is relatively balanced across the two periods, with 52 observations in the treatment group during the non Eid al-Adha period and 54 during the Eid al-Adha period, as opposed to 108 and 106 observations, respectively, in the comparison group. The result variable, NTPT, has an mean of 103.75, a standard deviation of 6.65, and ranges from 90.83 to 133.54. This sample structure provides the variation among treatment groups and periods to assess the differing impacts on the welfare of livestock farmers due to heightened qurban slaughter rates.

Table 3 shows the estimated impact of qurban on the welfare of small scale livestock farmers using the DiD method with data on the total number of livestock slaughtered.

Table 3. Estimation DiD Model 1

Group	Before (pre-treatment)				After (post-treatment)				change in Mean
	obs.	Mean	Std.Dev	S.E	obs.	Mean	Std.Dev	S.E	
Control	108	103.351	6.314	1.128	106	105.084	6.702	1.126	1.733
Treated	52	102.659	6.868	1.128	54	102.973	6.868	1.126	0.314
Difference		-0.692				-2.111			-1.419

Means and Standard Errors are estimated by linear regression.

Significance levels: *** p<0.01; ** p<0.05; * p<0.1

Source: data processed, 2025

The estimation results show that the welfare of livestock farmers increased after the Eid al-Adha period in all provinces. In a province where there is high animal slaughter for religious purposes (treatment group), the welfare indicator value increased from 102,659 in Q2 to 102,973 in Q3, which is an increase of 0.314 points. Meanwhile, in the provinces with lower growth (control group), the welfare value increased from 103,351 to 105,084 (an increase of 1,733 points). The estimated DiD is -1.419 ($p = 0.367$), which shows that the increase in well being in areas with a surge in sacrificial activity is not significantly different from areas with low growth, and this difference is not statistically significant. This indicates that the sacrifice ritual has not had a relatively strong impact on the welfare of small farmers.

The Effect of inflation on Model 1

Table 4. Estimation DiD Model 1 with Inflation as Control Variable

Group	Before (pre-treatment)				After (post-treatment)				change in Mean
	obs.	Mean	Std.Dev	S.E	obs.	Mean	Std.Dev	S.E	
Control	108	104.230	6.314	1.106	106	105.408	6.702	1.292	1.178
Treated	52	103.281	6.868	1.106	52	103.153	6.868	1.292	-0.128
Difference		-0.949				-2.255			-1.306

Means and Standard Errors are estimated by linear regression.

Significance: *** p<0.01; ** p<0.05; * p<0.1.

Source: data processed, 2025

Table 4 shows that after considering the effect of inflation, the increase in well being that was previously observed becomes smaller. In a province where the level of sacrificial activity grew a lot, the welfare value dropped from 103,281 in Q2 to 103,153 in Q3, which is a decrease of -0.128 . Meanwhile, in provinces where the growth was lower, the welfare value went up from 104,230 to 105,408, which is an increase of $+1,178$. The estimated Difference in Differences effect decreases from $-1,419$ to $-1,306$ and remains statistically not significant ($p = 0.399$).

This shows that general price increases also affect changes in well-being, so the economic benefits that farmers receive from higher demand for sacrificial animals are decreasing.

Model 2. Qurban Animals Slaughtered Outside RPH

The second part focuses on sacrificial animals slaughtered outside official slaughterhouses (RPH). As an alternative treatment specification, this model provides a more specific assessment of the relationship between the slaughter of sacrificial animals outside slaughterhouses and the welfare of livestock farmers. Table 5 presents sample composition and descriptive statistics utilized in the Difference in Differences (DiD) analysis for sacrificial animals slaughtered outside official slaughterhouses.

Table 5. Sample Composition and Descriptive Statistics
for Qurban Animals Slaughtered outside RPH

Panel A. Sample Composition by Treatment Group and Period					
Qurban	Non Eid al-Adha Quarter (idkuartal =0)	Non Eid al-Adha Quarter (idkuartal =0)	Total		
0 (Control Group)	47	47	94		
1 (Treatment Group)	113	113	246		
Total	160	160	320		
Panel B. Descriptive Statistics of the Outcome Variable					
NTPT	Obs.	Mean	Std. Dev	Min	Max
	320	103.7486	6.6521	90.83	133.54

Source: Author's calculations based on the 2025 dataset

The dataset consists of 320 observations evenly distributed between the non Eid al-Adha and Eid al-Adha quarterly periods, with each period comprising 160 observations. Among these observations, 226 (70.63%) are classified as the treatment group, covering observations related to qurban animals slaughtered outside official slaughterhouses, while 94 (29.38%) constitute the comparison group. Both groups are evenly distributed across the two periods, with 113 treatment group observations and 47 comparison group observations in each period.

The outcome variable, the Livestock Farmers' Terms of Trade (NTPT), has a mean index value of 103.7486, a standard deviation of 6.6521, and a range of 90.83 to 133.54. This sample composition provides a balanced temporal structure for Difference in Differences analysis while capturing variations in farmer welfare as measured by the NTPT index.

Table 6 shows the estimated impact of qurban on the welfare of small scale farmers using the DiD method with data on the number of animals slaughtered outside RPH.

Table 6. Estimation DiD Model 2

Group	Before (pre-treatment)				After (post-treatment)				change in Mean
	obs.	Mean	Std.Dev	S.E	obs.	Mean	Std.Dev	S.E	
Control	47	102.142	6.070	1.181	47	103.379	6.198	1.153	1.237
Treated	113	103.535	6.634	1.181	113	104.784	6.988	1.153	1.249
Difference		1.392				1.405			0.013

Means and Standard Errors are estimated by linear regression.

Significance: *** p<0.01; ** p<0.05; * p<0.1.

Source: data processed, 2025

The estimated DiD from Model 2 shows that farmers' well-being increased after the Eid al-Adha period in both groups of provinces. In the province where there is high activity related to animal sacrifice (treatment group), the welfare indicator value increased from 103,535 in Q2 to 104,784 in Q3, which is an increase of 1,249 points. In the province with slower growth (control group), the well being value increased from 102,142 to 103,379, which is an increase of 1,237 points. The difference in well being between the treatment group and the control group remained relatively the same, going from 1,392 before the sacrifice period to 1,405 after the sacrifice period. The estimated DiD is 0.013 ($p = 0.994$), which shows that the increase in well being for both groups is almost the same and not statistically significant. This finding suggests that the surge in sacrificial animal activities does not have an extra positive effect on the welfare of small farmers, as the increase mainly reflects a general trend experienced across the entire region.

The Effect of inflation on Model 2

Table 7. Estimation DiD Model 2 with Inflation as Control Variable

Group	Before (pre-treatment)				After (post-treatment)				change in Mean
	obs.	Mean	Std.Dev	S.E	obs.	Mean	Std.Dev	S.E	
Control	46	103.029	6.070	1.057	46	103.881	6.198	1.283	0.852
Treated	114	104.166	6.634	1.057	114	104.915	6.988	1.283	0.749
Difference		1.136				1.034			-0.102

Means and Standard Errors are estimated by linear regression.

Significance: *** p<0.01; ** p<0.05; * p<0.1.

Source: data processed, 2025

The estimated DiD from Model 2, after controlling for inflation, shows that farmers' well being increased in both groups of provinces after the Eid al-Adha period. In the province with high levels of pilgrimage activity (treatment group), the welfare indicator value increased from 104,166 in Q2 to 104,915 in Q3, a rise of 0.749 points. Meanwhile, in the provinces with lower

growth (control group), the welfare value increased from 103,029 to 103,881 (an increase of 0.852 points). The gap in welfare between the treatment group and the control group slightly decreased, from 1.136 before the Eid period to 1.034 after the Eid period. The estimated DiD is -0.102 ($p = 0.950$), indicating that the change in well being for both groups is almost the same and not statistically significant. This finding suggests that after taking into account the effect of general price increases, the surge in sacrificial animal activities does not add any additional impact on the real well being of small farmers.

Parallel Trends

Figure 6 presents pre treatment trends in the Livestock Farmers' Terms of Trade Index (NTPT) for the treatment and control groups based on two treatment specifications. In Model 1, both groups exhibited an upward trend during the pre treatment period, although the treatment group showed a more gradual increase compared to the control group. Similarly, Model 2 shows a similar directional movement between the two groups prior to treatment. Overall, no striking differences were observed in the pre-treatment trajectories, providing visual support for the validity of the parallel trends assumption underlying the DiD approach.

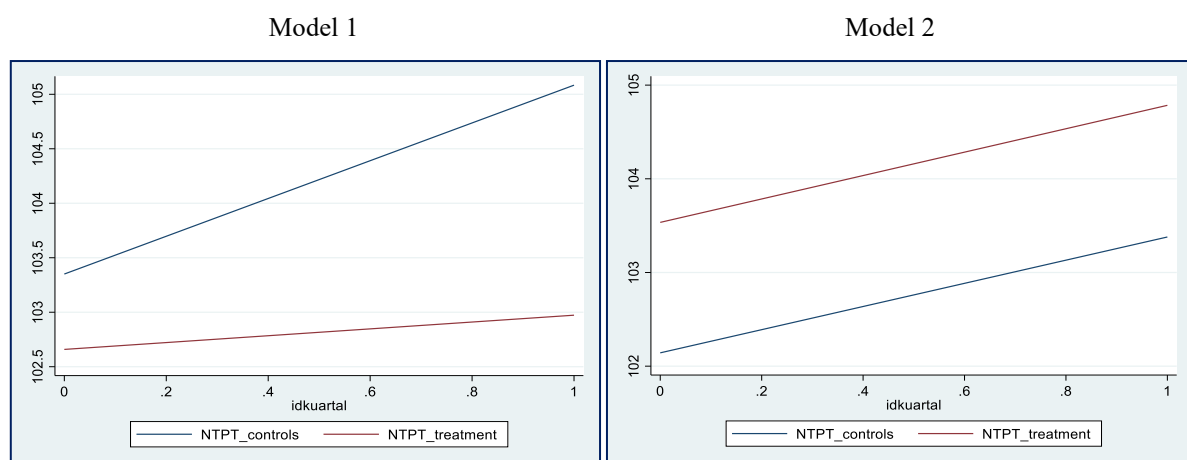


Figure 6. Visual Assessment of The Parallel Trends

Placebo Test

To further assess the validity of the DiD estimates, a placebo test was conducted by randomly assigning treatment status to provinces within the control group. This procedure was designed to test whether the estimated treatment effect could arise solely from random assignment rather than reflecting the actual impact of the qurban activities. The placebo analysis consisted of an initial placebo regression followed by randomization inference using 500 permutations.

For Model 1, the placebo regression yielded a non significant interaction coefficient ($\beta = -0.561$; $p = 0.100$), indicating that random treatment assignment did not produce a statistically significant effect on farmers' well being. Further randomization inference showed that the original DiD coefficient ($\beta = -1.419$) fell within the distribution of placebo estimates, suggesting that the estimated effect did not differ substantially from coefficients generated based on random treatment assignment. Consequently, the placebo analysis provides only limited support for a causal interpretation of the Model 1 estimates; therefore, the results should be interpreted with caution. For Model 2, the placebo regression also yielded a non-significant interaction coefficient ($\beta = 0.171$; $p = 0.709$). The distribution of placebo estimates is more symmetrical and concentrated around zero, with the original DiD coefficient ($\beta = 0.013$) situated near the center of the distribution. These findings indicate that the estimated effect is unlikely to be driven by random treatment assignment and provide stronger support for the credibility of the Model 2 estimates. The placebo analysis provides additional evidence regarding the validity of the DiD identification strategy. Although both models consistently indicate that qurban activities do not have a statistically significant impact on the welfare of livestock farmers, the results of the placebo analysis suggest that the evidence obtained from Model 2 is stronger than that obtained from Model 1.

Robustness Check

To examine the robustness of the main findings, the DiD model was re-estimated using standard errors derived via the bootstrap method. As shown in Table 7, the estimated treatment effects generally remained unchanged across model specifications.

Table 7. Robustness Check Using Bootstrapped Standard Errors

Model	DiD Coefficient	Std. Error	p-value	Conclusion
Model 1	-1.419	1.441	0.324	Not significant
Model 2	0.013	1.268	0.992	Not significant
Model 1 + Inflation	-1.419	1.441	0.324	Not significant
Model 2 + Inflation	0.006	0.006	0.996	Not significant

Source: data processed, 2025

For Model 1, the DiD coefficient remained negative and statistically insignificant ($\beta = -1.419$; $p = 0.324$), while Model 2 likewise showed no significant treatment effect ($\beta = 0.013$; $p = 0.992$). Similar results were obtained after including inflation as a control variable. The consistency of coefficient estimates and statistical significance across the robustness analyses

indicates that the main conclusions are not affected by the estimation approach employed in this study.

DISCUSSION

Difference in Differences (DiD) estimates consistently indicate that qurban activities were not associated with a statistically significant increase in the welfare of small scale livestock farmers at the provincial level during the 2017–2021 observation period. This finding holds true across both treatment specifications, total qurban slaughter (Model 1) and slaughter performed outside official slaughterhouses (Model 2). Although the magnitudes of the estimated coefficients differ slightly, neither specification provides statistical evidence that the seasonal rise in qurban slaughter improves the Livestock Farmers' Terms of Trade (NTPT). Consequently, these findings suggest that, within the scope of this study, an increase in qurban activity alone is insufficient to generate a measurable improvement in livestock farmer welfare at the provincial level.

The current findings are generally consistent with previous studies indicating that the seasonal surge in demand for qurban (sacrificial livestock) does not automatically translate into improved welfare for small scale livestock farmers. Abidin et al. (2024) argue that the welfare impact of livestock production depends not only on market demand but also on the effectiveness of financing mechanisms and integrated supply chain management that enable smallholders to access markets more efficiently. Similarly, Daulay et al. (2020) demonstrate that longer marketing channels drive up selling prices and marketing margins, implying that a significant portion of the economic benefits generated during qurban may be captured by intermediaries rather than producers. These findings also align with Hidayat and Munshi (2019), who emphasize the importance of improving livestock distribution systems to enhance market efficiency. However, the findings of this study diverge from the broader welfare perspective proposed by Zakiyah (2011), which highlights the potential of qurban to improve rural welfare through Islamic redistribution mechanisms. This discrepancy may arise because the present study evaluates welfare using aggregated provincial level NTPT data, whereas the broader social and distributive benefits of qurban may not be fully captured by aggregate welfare indicators.

One possible explanation for these findings is that the temporary surge in livestock demand during Eid al-Adha may be insufficient to generate a sustained improvement in farmers'

welfare. According to supply and demand theory, higher seasonal demand is generally expected to boost prices and producer income (Mankiw, 2021a). However, this theoretical expectation may not fully materialize when market benefits are unevenly distributed along the livestock supply chain. Smallholder farmers often face limited bargaining power, restricted market access, and a reliance on intermediaries, all of which can reduce the share of value captured at the farm level (Abidin et al, 2024; Daulay et al, 2020). Consequently, higher demand for sacrificial animals does not necessarily translate into greater purchasing power or a measurable improvement in the Livestock Farmers' Terms of Trade (NTPT). Therefore, these findings offer only limited support for the trickle down hypothesis (Todaro and Smith, 2020), suggesting that increased market activity alone may be inadequate to enhance livestock farmers' welfare in the absence of complementary institutional and market interventions.

Although the estimated intervention effect is not statistically significant, the findings remain economically meaningful. They suggest that simply increasing the volume of qurban slaughter may be insufficient to improve the welfare of small scale livestock farmers. Instead, the economic benefits derived from seasonal demand likely depend on how effectively farmers are integrated into the livestock supply chain. Enhancing direct market access, shortening marketing channels, strengthening institutional partnerships between farmers and qurban organizers, and improving supply chain efficiency can facilitate the transmission of market benefits to primary producers (Abidin et al, 2024; Hidayat and Munshi, 2019). Similarly, reducing the number of intermediaries could enable farmers to capture a larger share of the value generated during the qurban season (Daulay et al, 2020). Therefore, policies aimed solely at increasing qurban activities are unlikely to yield significant welfare improvements unless accompanied by broader institutional and market reforms that enhance the participation and bargaining power of small scale livestock farmers.

The inclusion of inflation as a control variable does not alter the study's main findings. Although inflation is theoretically expected to reduce farmers' purchasing power by raising production costs and household expenditures (Blanchard, 2017; Samuelson & Nordhaus, 2009), the estimated treatment effect remains statistically insignificant after controlling for inflation. This indicates that short term fluctuations in qurban demand alone are insufficient to offset the broader macroeconomic pressures affecting livestock farmers' welfare. Consequently, the expansion of the seasonal market during Eid al-Adha should be viewed as merely one of several factors influencing farmers' economic well being, alongside production costs, market conditions, and other structural characteristics of the livestock sector.

Several limitations should be considered when interpreting these findings. First, this study measures livestock farmers' welfare using the Livestock Farmers' Terms of Trade Index, while this metric captures purchasing power at the provincial level, it may not fully reflect other dimensions of welfare such as household income, production performance, market participation, or contractual relationships within the livestock value chain. Second, the analysis relies on aggregated provincial level data, which may mask heterogeneity among individual farmers and production systems. Nevertheless, additional assessments of parallel trends, placebo tests, and robustness analyses provide further support for the consistency of the empirical findings within the employed DiD framework. Future research could extend this analysis by utilizing farm level or household level panel data, incorporating multidimensional welfare indicators, and examining institutional factors that may influence the distribution of economic benefits derived from qurban activities.

CONCLUSION

This study examines whether qurban activities improve the welfare of small scale livestock farmers in Indonesia, employing a DiD approach based on provincial level panel data covering the 2017–2021 period. Across both treatment specifications namely, the total volume of qurban slaughter and slaughter conducted outside official slaughterhouses. The results consistently indicate that the seasonal surge in qurban activity has no statistically significant effect on the Livestock Farmers' Terms of Trade, even after controlling for inflation. Supplementary assessments of parallel trends, placebo tests, and robustness analyses further reinforce the consistency of these findings. These results suggest that a seasonal increase in demand alone is insufficient to generate measurable welfare improvements for small scale farmers, as the economic benefits of qurban may not fully filter through existing livestock marketing channels. Consequently, enhancing farmers' market access, strengthening institutional partnerships, and improving supply chain efficiency are likely more critical than merely increasing qurban activity. This study contributes to the literature by presenting empirical evidence on the impact of qurban on welfare using a quasi-experimental approach at the provincial level. Nevertheless, these findings should be interpreted with certain limitations in mind particularly the use of NTPT as an aggregate proxy for welfare and the reliance on province level data, which may not fully capture the multidimensional aspects of farmers' welfare or the heterogeneity among individual households. Therefore, future research is encouraged to utilize household level panel

data and broader welfare indicators such as income, production performance, and market participation to provide a more comprehensive assessment of the economic impact of qurban.

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