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Statistical analysis on the data collected from the PRICE survey 2022 implemented in Nigeria within the 50x2030 Program

In depth analysis of livestock price data, NASS 2022/23

By TIOTSOP TSATSOP Armel Blaise

Statistical- Economist Engineer,

Statistician, ESS

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FOREWORD

This document has two objectives. It's intended to the following:

- 1) give an overview of the quality of Livestock price data collected through the 2022 price survey in Nigeria, and
- 2) inform on the homogeneity of prices between geographic area.

I. Analysis of the quality of data on price

This section answers two main questions

- i) have we succeeded in improving the completeness and quality of our data, particularly reduce the influence of extreme values?
- ii) Are the rates of missing values reasonable?

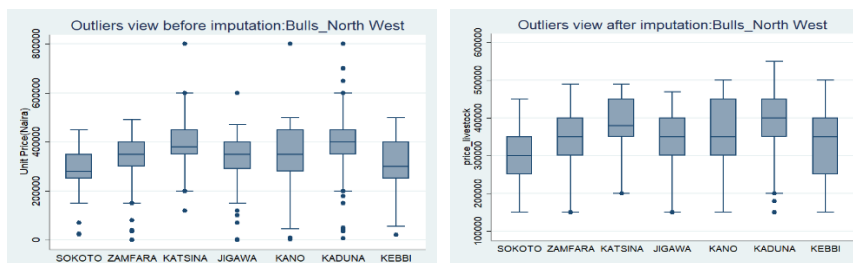
Regarding edition and imputation of outlier, as a reminder, price processing was carried out in five (5) stages:

- I) check for missing values;
- II) imputation using information available in variables on other livestock
- III) analysis of price consistency within states and zones using box plots and histograms. Sometimes, that lead to the decision to divide excessively large values by 10;
- IV) (micro) edition and imputation (*within STATE*) of outliers using p05 for the lower threshold and $Q3/4 + 2*IQR$ for the upper threshold (to decide we compare four strategies for different upper threshold: (i) $Q3/4 + 1.5*IQR$, (ii) $Q3/4 + 2*IQR$, (iii) $Q3/4 + 3*IQR$ and (iv) $Q3/4 + 2*Sigma$).
- V) (macro) edition and imputation to obtain estimates (median and mean) that are consistent between states in the same zone.

Main results: Through the various processes, about 13% of data on price had been imputed.

Regarding outliers: Box plots of prices before and after the data processing are presented side by side by zone and by item. It can be seen that the ranges of values are greatly reduced throughout the process. Outliers are treated, and the final data are fairly homogeneous and concentrated.

Let consider for example the case of Livestock=Bulls, zone= North West. Before data processing (*the left box plot*), the prices ranged from zero to 800,000. After processing, values ranged from 15,000 to 50,000.



(All of the box plot, before and after processing are presenting in Appendix 1).

Particularly very low values and very high prices have been found and treated during the imputation of extreme values. We can assume that, because of the large price values, agents have sometimes recorded prices by entering one more or less digit zero. Obviously, after one stage of imputation of outliers, news one appears.

In addition, analysis of the first price estimates revealed few differences between the median prices of states within the same zone.

Then to bring the median price spreads between states in the same zone down to a more reasonable scale, the solution was to proceed via macro editing, by identifying and progressively imputing new outliers that appear, while monitoring the effect on reducing price differentials between states.

We can conclude that data was comprehensive, and the quality had been improved by the clearing process.

II. Comparative analysis of Livestock price by geographic area

The final stage of price data processing was about macro edition, consisted in a review of the estimates guided by the objective of having comparable (median) results between the states of the same zone. At the end of the process, therefore, it makes sense to verify if there are some inequalities between states of the same zone, and between different zones. To do this, the following tests are performed:

- i) **To assess the similarity of prices between states within zone, we compare medians and means:** The “K-sample equality-of-medians test”: the null hypothesis that the K samples were drawn from populations with the same median. To say that the (median) prices of states are the same or comparable within zones implicitly refers to the null hypothesis. If not, the medians are statistically distinct between states of a zone (Table1).

The strategy for this test uses the procedure chi-squares test as follow: Firstly, for each Livestock, the sample of each zone is split into two groups: communities with price values greater than (or equal to) the median (the group “yes”), and the groups with price less than the median (the group “no”).

Then, the chi-squares test is performed by cross-tabulating the group variable with the states (within the zone). Since the chi-square test is an asymptotic test, there must be at least no (or few) expected values below five. We performed the test only when the size of a state is at least equal to ten.

Livestock for which the medians are statistically equal between states and within zone are highlighted in table 1. We can see that in most cases, medians are statistically different from one state to another in the same zone.

For confirmation purposes, we also perform a comparison of means test. To the Fisher statistic, we add the (robust) Welch's test which corrects the Fisher statistic in the event of unequal variances between groups (see Table1).

- ii) **To assess the similarity of prices between zones,** we compare means, by performing the one-way ANOVA test. This compare means between zones. To identify zones with equal/different means, we use a multiple comparison test (see Table 2 for comments, and Appendix 2 for details).
- iii) **To assess the similarity of prices between sector (rural versus urban),** we also performed t-test to compare means of prices by regions (see appendix 3).

All tests are obviously made by Livestock. Results are significant at the 5% level.

Tests of equality of medians / means between states within zones: Table1 contains results of the two tests (equality of medians and equality of means). The main finding is that, although the median values of the states of each zone seem to be close, little significant differences remain in almost all Livestock. The only Livestock for which medians are equals between states for almost all zones is Pigs - Sows (adult female pig, reproductive age) (bold lines indicate equality of medians in Table1, at a 5% level). Some other Livestock have certain zones with equal values between states.

Table 1: By Livestock and by zone, K-sample equality-of-medians test

Livestock	K-sample equality-of-medians test (H_0 : Prices of states came from a population with a same median)			Homoscedasticity test (H_0 : equal variance)				Tests of Equality of Means (H_0 : Equal means between state)			
	Zone	Pearson chi2	P-value	Stat of Levene	ddl1	ddl2	P-value	ANOVA (Fisher test)		Welch Correction	
								F	P-value	Stat of Welch	P-value
Bulls	North Central	50.6	<0.001	5.4	6	589	0.000	11.1	<0.001	15.4	<0.001
Bulls	North East	79.2	<0.001	1.6	5	1 402	0.170	23.6	<0.001	22.8	<0.001
Bulls	North West	141.2	<0.001	7.4	6	1 652	<0.001	22.9	<0.001	26.4	<0.001
Bulls	South East	0.2	0.899	1.4	1	51	0.243	1.1	0.299	0.9	0.353
Bulls	South West	15.4	<0.001	4.9	2	114	0.009	7.1	0.001	5.9	0.004
Oxen	North Central	0.3	0.869	1.8	2	70	0.168	0.0	0.973	0.0	0.965
Oxen	North East	34.5	<0.001	3.9	5	659	0.002	12.9	<0.001	14.6	<0.001
Oxen	North West	89.2	<0.001	17.8	6	710	<0.001	15.3	<0.001	29.0	<0.001
Cows - dairy	North Central	92.4	<0.001	7.9	6	1 199	<0.001	19.9	<0.001	30.3	<0.001
Cows - dairy	North East	31.2	<0.001	3.3	5	1 705	0.006	9.4	<0.001	8.9	<0.001
Cows - dairy	North West	63.1	<0.001	5.7	6	2 245	<0.001	15.7	<0.001	19.4	<0.001
Cows - dairy	South West	20.1	<0.001	3.3	3	268	0.021	5.5	0.001	6.2	0.001
Heifers	North Central	21.3	<0.001	33.5	1	94	<0.001	62.1	<0.001	46.7	<0.001
Heifers	North East	35.4	<0.001	8.1	5	607	<0.001	9.8	<0.001	6.7	<0.001
Heifers	North West	13.6	0.034	8.2	6	532	<0.001	2.6	0.015	3.5	0.003
Steers	North East	27.8	<0.001	8.0	5	244	<0.001	2.6	0.025	7.5	<0.001
Steers	North West	11.8	0.019	2.6	4	229	0.035	2.5	0.043	2.3	0.065
Calves - Males/Fem.	North Central	32.1	<0.001	2.0	5	179	0.079	7.8	<0.001	7.8	<0.001
Calves - Males/Fem.	North East	26	<0.001	19.1	5	407	<0.001	9.4	<0.001	4.9	<0.001
Calves - Males/Fem.	North West	38.1	<0.001	4.4	6	546	<0.001	5.7	<0.001	5.8	<0.001
Goats - She	North Central	82.2	<0.001	1.6	6	2 746	0.143	14.7	<0.001	15.6	<0.001
Goats - She	North East	6.6	0.25	6.5	5	2 469	<0.001	5.2	<0.001	5.6	<0.001
Goats - She	North West	65.4	<0.001	10.1	6	3 277	<0.001	21.7	<0.001	24.2	<0.001
Goats - She	South East	21.7	<0.001	11.6	4	1 255	<0.001	11.0	<0.001	9.6	<0.001
Goats - She	South South	55.6	<0.001	21.5	5	1 100	<0.001	14.2	<0.001	14.6	<0.001
Goats - She	South West	73.5	<0.001	2.8	5	1 502	0.015	17.7	<0.001	16.4	<0.001
Goats - He	North Central	60.7	<0.001	5.7	6	2 706	<0.001	17.7	<0.001	18.6	<0.001
Goats - He	North East	62.1	<0.001	6.5	5	2 421	<0.001	16.7	<0.001	22.5	<0.001
Goats - He	North West	25.8	<0.001	3.8	6	3 175	0.001	4.8	<0.001	8.2	<0.001
Goats - He	South East	84.7	<0.001	30.5	4	1 231	<0.001	40.8	<0.001	47.5	<0.001
Goats - He	South South	140.6	<0.001	5.6	5	1 112	<0.001	45.6	<0.001	41.0	<0.001
Goats - He	South West	189.4	<0.001	13.1	5	1 492	<0.001	59.4	<0.001	80.4	<0.001
Sheep - Ewes	North Central	31.7	<0.001	10.9	6	1 905	<0.001	14.0	<0.001	16.6	<0.001
Sheep - Ewes	North East	84.3	<0.001	6.9	5	2 034	<0.001	26.0	<0.001	24.9	<0.001
Sheep - Ewes	North West	159.6	<0.001	12.8	6	2 836	<0.001	33.3	<0.001	27.0	<0.001
Sheep - Ewes	South East	22.1	<0.001	4.9	4	628	0.001	7.9	<0.001	6.6	<0.001
Sheep - Ewes	South South	47.2	<0.001	32.9	4	339	<0.001	18.7	<0.001	13.6	<0.001
Sheep - Ewes	South West	11.1	0.05	7.8	5	742	<0.001	4.3	0.001	4.5	0.001
Sheep - Rams	North Central	90.2	<0.001	10.7	6	2 028	<0.001	17.3	<0.001	19.8	<0.001
Sheep - Rams	North East	55	<0.001	21.6	5	2 306	<0.001	27.5	<0.001	30.5	<0.001
Sheep - Rams	North West	153.4	<0.001	18.3	6	3 103	<0.001	23.3	<0.001	21.9	<0.001
Sheep - Rams	South East	2.8	0.591	0.9	4	587	0.447	3.6	0.007	3.5	0.009
Sheep - Rams	South South	46.9	<0.001	66.8	4	321	<0.001	27.0	<0.001	19.1	<0.001
Sheep - Rams	South West	42.8	<0.001	8.3	5	801	<0.001	7.3	<0.001	8.4	<0.001
Camels - She	North East			0.6	1	28	0.433	1.4	0.255	1.6	0.212
Camels - She	North West	57.6	<0.001	9.3	5	383	<0.001	12.6	<0.001	25.7	<0.001
Camels - He	North West	58.8	<0.001	12.4	5	451	<0.001	15.6	<0.001	23.6	<0.001
Pigs - Sows (adult female pig, rep. age)	North Central	10.9	0.093	3.3	6	883	0.003	1.8	0.093	2.2	0.049
Pigs - Sows (adult female pig, rep. age)	North East	8.1	0.087	10.8	4	365	<0.001	10.1	<0.001	10.8	<0.001
Pigs - Sows (adult female pig, rep. age)	South East	45.2	<0.001	11.8	4	536	<0.001	16.9	<0.001	17.6	<0.001
Pigs - Sows (adult female pig, rep. age)	South South	7.1	0.212	13.8	5	517	<0.001	0.9	0.487	1.2	0.329
Pigs - Sows (adult female pig, rep. age)	South West	43.9	<0.001	6.9	5	411	<0.001	10.2	<0.001	9.7	<0.001
Pigs - Boar	North Central	5.9	0.433	2.0	6	856	0.057	1.0	0.452	0.9	0.490
Pigs - Boar	North East	36.4	<0.001	3.6	4	306	0.007	11.1	<0.001	19.3	<0.001
Pigs - Boar	South East	14.8	0.005	20.0	4	472	<0.001	11.6	<0.001	8.7	<0.001
Pigs - Boar	South South	50.9	<0.001	12.1	5	496	<0.001	10.9	<0.001	19.2	<0.001
Pigs - Boar	South West	29.5	<0.001	5.7	5	406	<0.001	9.0	<0.001	11.1	<0.001
Exotic/hybrid Chicken - hens / layers	North Central	39.2	<0.001	6.8	6	581	<0.001	5.5	<0.001	6.0	<0.001

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Exotic/hybrid Chicken - hens / layers	North East	45.4	<0.001	11.6	5	520	<0.001	13.4	<0.001	11.3	<0.001
Exotic/hybrid Chicken - hens / layers	North West	37	<0.001	1.4	6	607	0.202	1.6	0.148	7.9	<0.001
Exotic/hybrid Chicken - hens / layers	South East	61.4	<0.001	2.9	4	796	0.021	13.4	<0.001	13.2	<0.001
Exotic/hybrid Chicken - hens / layers	South South	53	<0.001	26.4	5	913	<0.001	26.2	<0.001	33.5	<0.001
Exotic/hybrid Chicken - hens / layers	South West	17.4	0.004	3.4	5	817	0.005	6.1	<0.001	6.7	<0.001
Exotic/hybrid Chicken - hens / broilers	North Central	25.9	<0.001	8.7	6	830	<0.001	12.4	<0.001	14.6	<0.001
Exotic/hybrid Chicken - hens / broilers	North East	35.1	<0.001	8.6	5	611	<0.001	14.6	<0.001	13.0	<0.001
Exotic/hybrid Chicken - hens / broilers	North West	37.3	<0.001	5.7	6	834	<0.001	7.4	<0.001	11.7	<0.001
Exotic/hybrid Chicken - hens / broilers	South East	11.2	0.025	6.7	4	970	<0.001	11.4	<0.001	10.7	<0.001
Exotic/hybrid Chicken - hens / broilers	South South	260.5	<0.001	23.0	5	1 062	<0.001	116.4	<0.001	108.7	<0.001
Exotic/hybrid Chicken - hens / broilers	South West	28	<0.001	4.6	5	1 280	<0.001	8.2	<0.001	8.9	<0.001
Local (indigenous) Chicken - hens	North Central	116.8	<0.001	6.6	6	2 697	<0.001	29.5	<0.001	24.5	<0.001
Local (indigenous) Chicken - hens	North East	90.2	<0.001	20.5	5	2 326	<0.001	44.7	<0.001	42.3	<0.001
Local (indigenous) Chicken - hens	North West	138.2	<0.001	5.9	6	3 050	<0.001	28.0	<0.001	26.2	<0.001
Local (indigenous) Chicken - hens	South East	140.3	<0.001	6.4	4	1 195	<0.001	50.7	<0.001	58.3	<0.001
Local (indigenous) Chicken - hens	South South	47	<0.001	13.8	5	1 224	<0.001	17.1	<0.001	16.0	<0.001
Local (indigenous) Chicken - hens	South West	64.8	<0.001	12.3	5	1 627	<0.001	25.7	<0.001	20.8	<0.001
Local (indigenous) Chicken - cock	North Central	67.1	<0.001	5.9	6	2 598	<0.001	23.9	<0.001	20.8	<0.001
Local (indigenous) Chicken - cock	North East	151.2	<0.001	2.1	5	2 238	0.060	1.8	0.106	4.4	0.001
Local (indigenous) Chicken - cock	North West	51	<0.001	11.1	6	2 987	<0.001	10.2	<0.001	9.7	<0.001
Local (indigenous) Chicken - cock	South East	56	<0.001	7.5	4	1 203	<0.001	29.4	<0.001	29.3	<0.001
Local (indigenous) Chicken - cock	South South	52.9	<0.001	10.3	5	1 203	<0.001	14.7	<0.001	14.7	<0.001
Local (indigenous) Chicken - cock	South West	13.9	0.016	9.0	5	1 603	<0.001	2.5	0.029	3.0	0.010
Turkey	North Central	65	<0.001	8.4	6	620	<0.001	10.3	<0.001	10.9	<0.001
Turkey	North East	11.7	0.039	4.3	5	710	0.001	4.9	<0.001	2.9	0.015
Turkey	North West	39.6	<0.001	6.8	6	961	<0.001	10.5	<0.001	9.5	<0.001
Turkey	South East	43.4	<0.001	12.4	4	503	<0.001	9.4	<0.001	11.8	<0.001
Turkey	South South	119.3	<0.001	27.5	5	431	<0.001	25.6	<0.001	36.4	<0.001
Turkey	South West	29.4	<0.001	12.3	5	722	<0.001	5.5	<0.001	6.6	<0.001
Ducks	North Central	172	<0.001	4.6	6	1 157	<0.001	30.7	<0.001	27.8	<0.001
Ducks	North East	57.7	<0.001	20.8	5	1 446	<0.001	32.1	<0.001	29.1	<0.001
Ducks	North West	72.2	<0.001	2.5	6	1 426	0.022	15.2	<0.001	15.5	<0.001
Ducks	South East	10.9	0.012	2.7	3	156	0.045	1.0	0.379	1.4	0.272
Ducks	South South	45.4	<0.001	8.0	5	337	<0.001	15.6	<0.001	11.5	<0.001
Ducks	South West	90.9	<0.001	20.1	5	411	<0.001	6.0	<0.001	18.1	<0.001
Geese	North Central	31.6	<0.001	7.2	2	44	0.002	5.9	0.005	5.5	0.009
Geese	North East	23.9	<0.001	4.3	4	81	0.003	4.4	0.003	3.1	0.027
Geese	North West	18.9	0.002	9.0	5	287	<0.001	3.2	0.007	3.3	0.009
Guinea fowls	North Central	36	<0.001	10.2	5	513	<0.001	22.7	<0.001	19.1	<0.001
Guinea fowls	North East	50.2	<0.001	10.1	5	1 113	<0.001	22.4	<0.001	17.4	<0.001
Guinea fowls	North West	51.8	<0.001	5.0	6	1 992	<0.001	5.1	<0.001	5.0	<0.001
Guinea fowls	South South			12.0	1	22	0.002	3.4	0.078	2.7	0.127
Guinea fowls	South West	7.4	0.059	2.4	3	126	0.072	0.7	0.569	0.8	0.479
Other poultry	North East	10	0.007	2.8	2	42	0.071	3.5	0.038	6.9	0.004
Other poultry	North West	15.1	0.001	4.1	2	82	0.021	6.2	0.003	6.1	0.006
Horses	North East	6.1	0.014	13.3	1	41	0.001	0.6	0.449	0.9	0.362
Horses	North West	11.7	0.02	2.9	4	114	0.024	2.3	0.062	2.4	0.064
Mules/Donkeys	North East	1	0.806	13.6	3	85	<0.001	2.7	0.050	1.8	0.166
Mules/Donkeys	North West	37	<0.001	11.3	6	500	<0.001	5.6	<0.001	10.6	<0.001

Tests of equality of means between zones: Table2 contains comments about tests of equality of means, and multiple comparison test between pairs of zones. Details of results are given in Appendix 2.

Table 2: By Livestock, interpretation of multiple comparison tests of average prices for zones

Livestocks	Results, comparison of average prices for zones
Bulls	Price values vary considerably from one between zones south has fairly median values Only South South has fairly median values The lowest difference (non-significant) is between North East and North West The largest difference is between South East and South South
Oxen	The three zones North East, North West and North Central have specifics values of price statistically different to others in average All other three zones have similar values of prices in average The largest difference is between North Central and South West The lowest difference (non-significant) is between South West and North West
Cows - diary. others	There are many similarities between prices between zones But prices are particularly low in the northern
Heifers	North West and South East have specifics values of price statistically different to others in average South East has the highest values of prices, when South South has the lowest ones.
Calves - Males/Females	The three zones North East, North Central and South West have almost similar values of prices South has highest values of price statistically different to others in average North Central has the lowest values of prices
Goats - She	Only the couple of zones (North Central and South West) has similar values of prices in average All other zones have values of price each statistically different to others in average The largest difference is between South South (highest prices) and North East
Goats – He	As for Goats – she We have similar prices for the couples of zones (North Central and South West), (North East and North West) and (South East and South South) The zone South South has the highest values
Sheep - Ewes	There are few pairs of zones with statistically similar values on average: (North East and North Central), or (South West and South East), or even (North Central and South South) Each of the other pairs of zones has significantly and highly different values The highest difference is between North West and South East
Sheep - Rams	The three zones (North East, North Central and South South) have similar values of prices on average The pair of zones (South West and North West) also have similar values of prices on average South East has the lowest values, significantly different to all other zones The highest difference is between North West and South East The lowest difference is between North East and South South
Camels - He	This livestock is only bred in the north Prices in the North West are significantly higher, when Prices in the North East are slightly lower
Pigs - Sows (adult female pig in reproduction age)	South South and South East have both the highest values of prices, each significantly different to all other zones All other zones have similar values (no statistical difference)
Pigs - Boar	South South and South East have both the highest values of prices, each significantly different to all other zones prices All other zones have similar values (no statistical difference)
Exotic/hybrid Chicken - hens / layers	Lowest prices are found in the far north zones (North East and North West), each significantly different to all other zones prices All other zones have similar values (no statistical difference)

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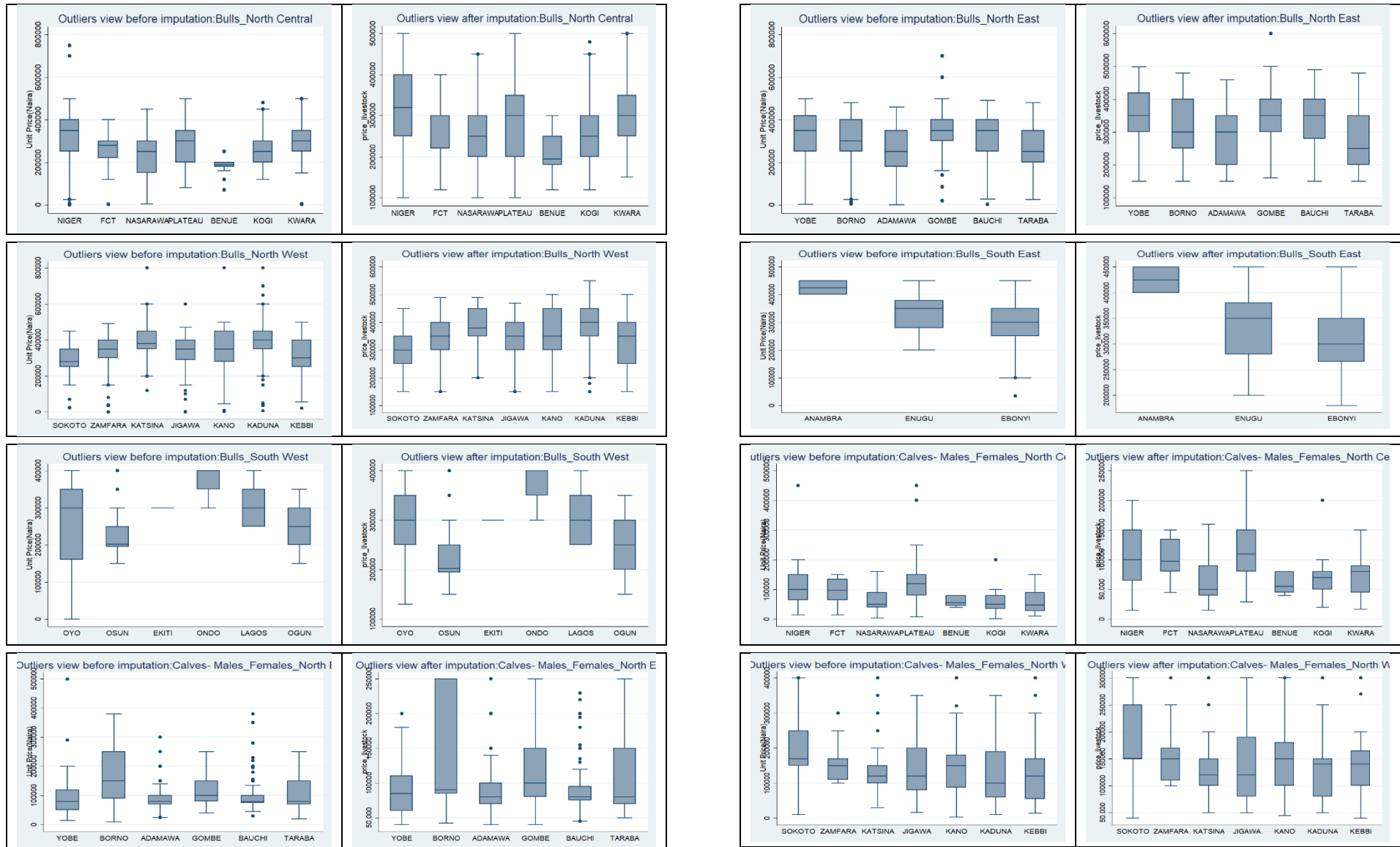
Exotic/hybrid Chicken - cocks / broilers	Prices differ significantly from one zone to another The highest price is found in South South, and The lowest price is found in North West
Local (indigenous) Chicken - hens	Prices differ significantly from one zone to another The highest price is found in South East, and The lowest price is found in North East
Local (indigenous) Chicken - cock	Prices differ significantly from one zone to another The highest price is found in South South, and The lowest price is found in North West
Turkey	South East and South South have similar values of price in average Prices differ significantly from one zone to another for all others The highest price is found in South East, and The lowest price is found in North West
Ducks	North East and North West have similar values of price in average Prices differ significantly from one zone to another for all others The highest price is found in South West, and The lowest price is found in North East
Guinea fowls	Prices are identical in the southern zones. The three southern zones also have the highest prices Prices differ significantly from one zone to another for all others The lowest price is found in North East
Other poultry	Prices are identical in the southern zones. The three southern zones also have the highest prices Prices are identical in the northern zones, the lowest values
Rabbit	Rabbit is only bred in the northern and the southwestern, and prices are fairly similar

III. Conclusion and recommendations

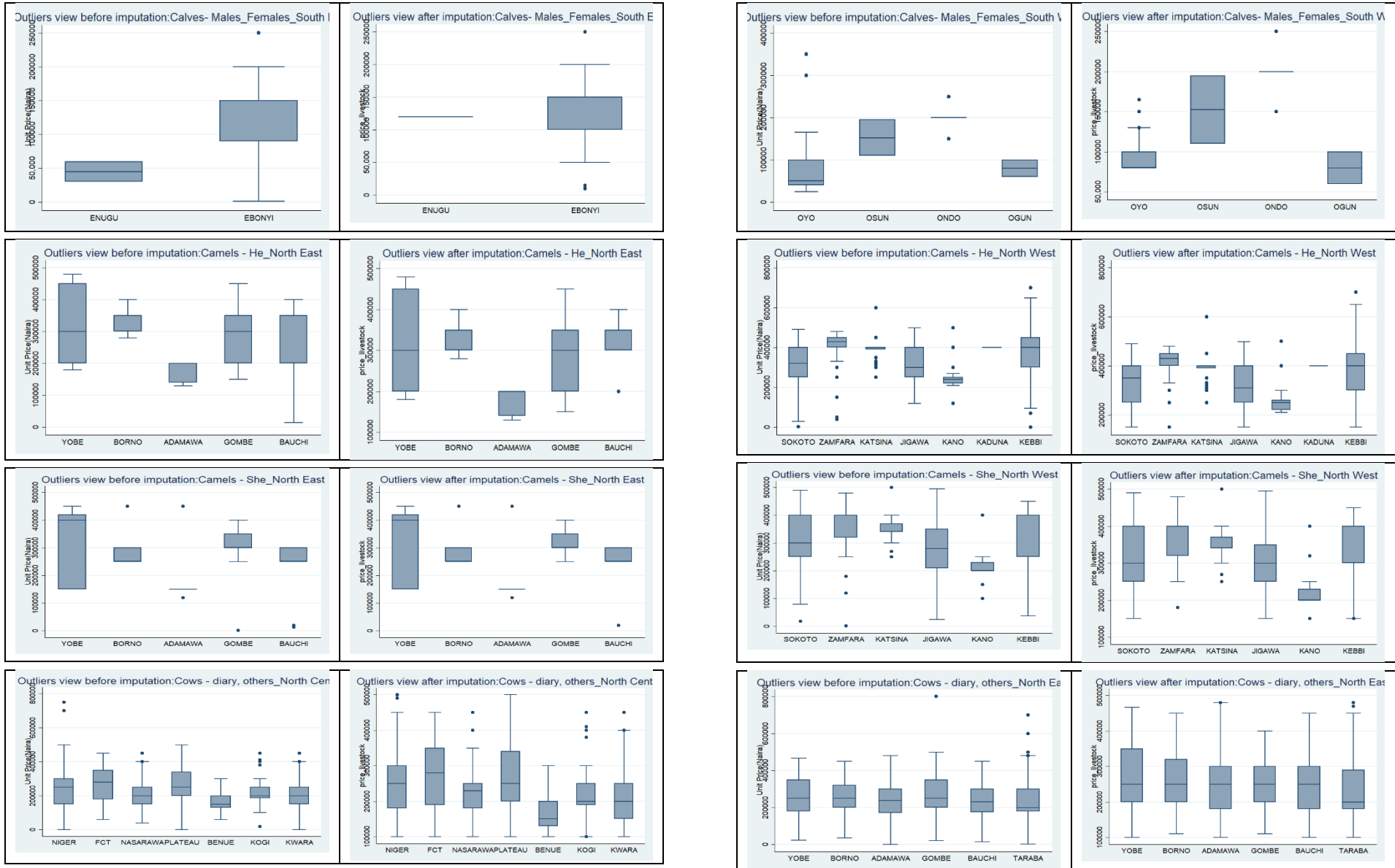
The data-processing process has improved the pertinence of the data on price, mainly by imputing extreme values and many missing values. Estimated median prices are fairly close between states in the same zone, but remain significantly different. There are therefore slight but significant price differences between states in the same zone, but significant differences between zones.

The presence of certain abnormally high or low prices suggests that agents have sometimes recorded prices by entering one more or less digit zero. Special care must be taken during data collection operations this kind of error. For example, input masks could include controls with warning messages when the agent enters a value outside the 90% confidence interval.

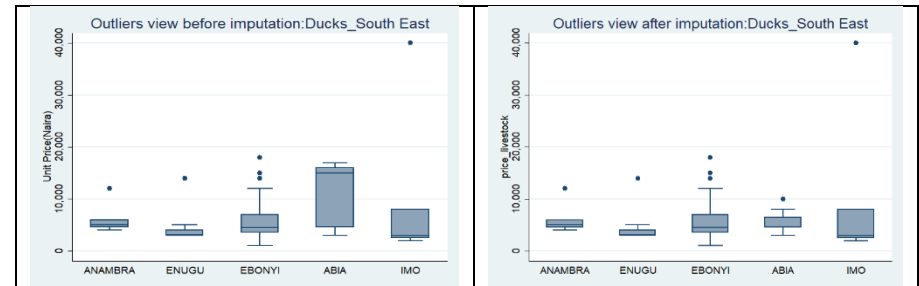
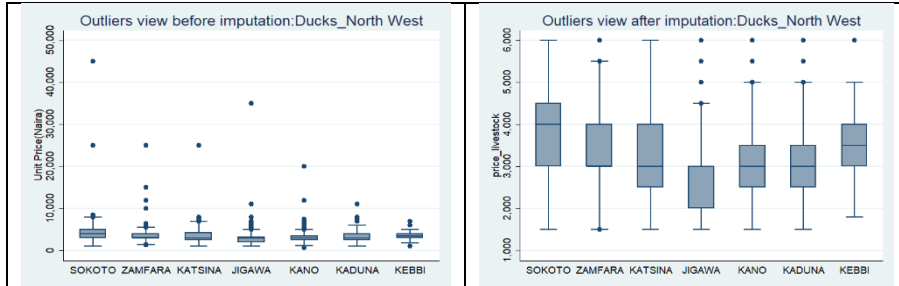
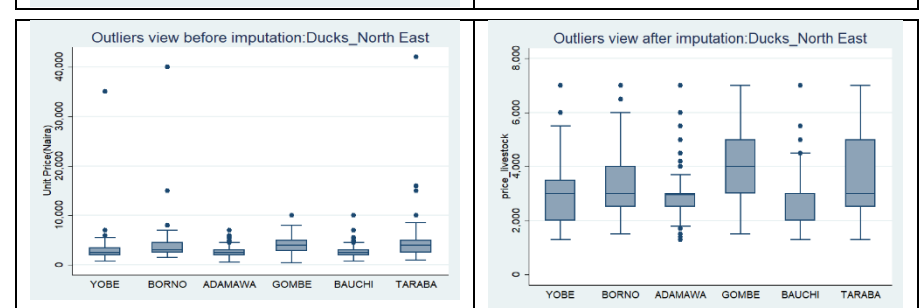
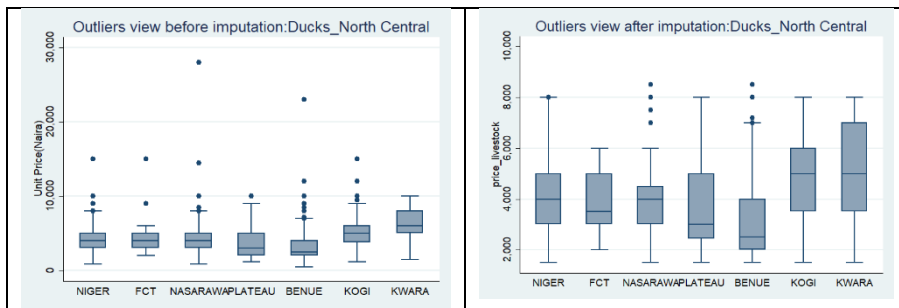
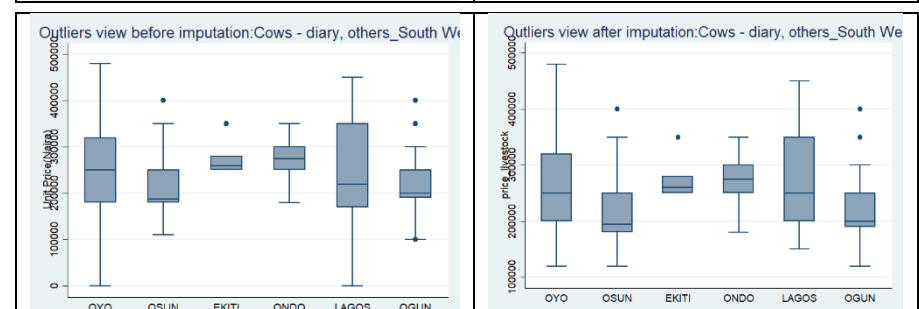
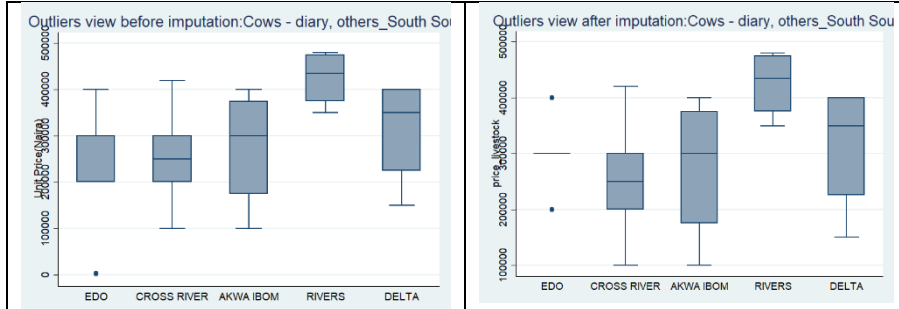
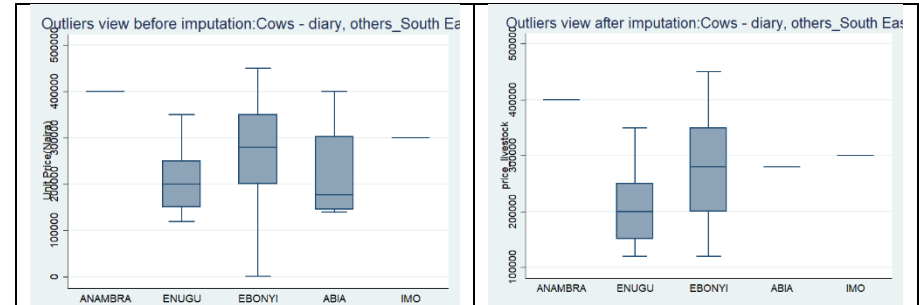
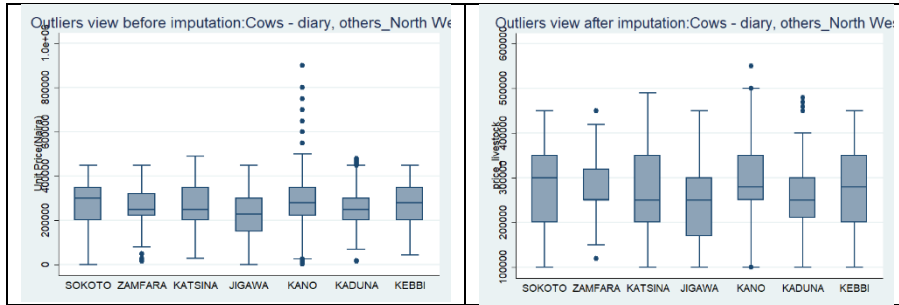
Appendix 1. : By Livestock and by zone, box plots of price in states comparison before versus after data processing



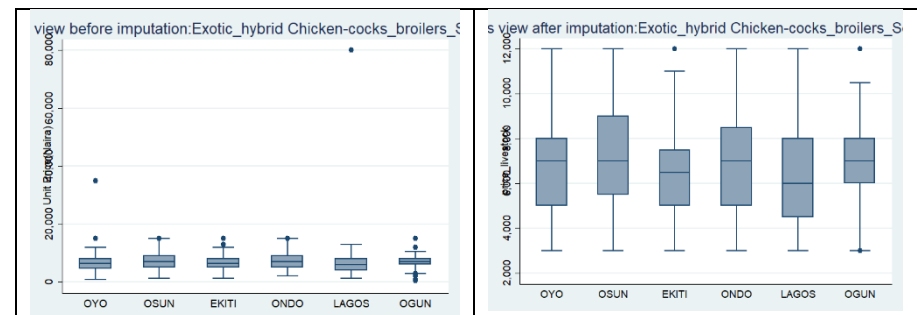
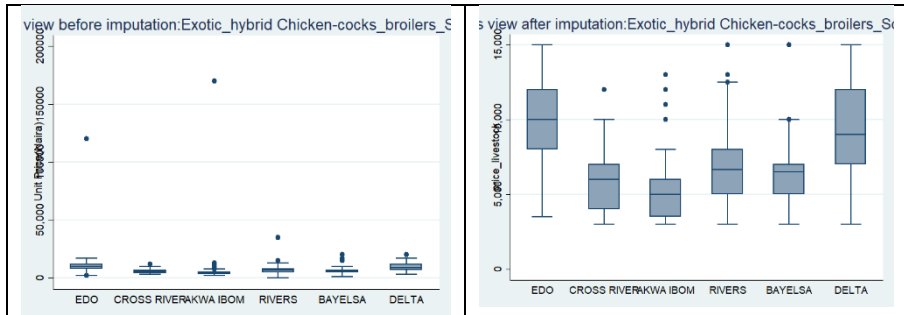
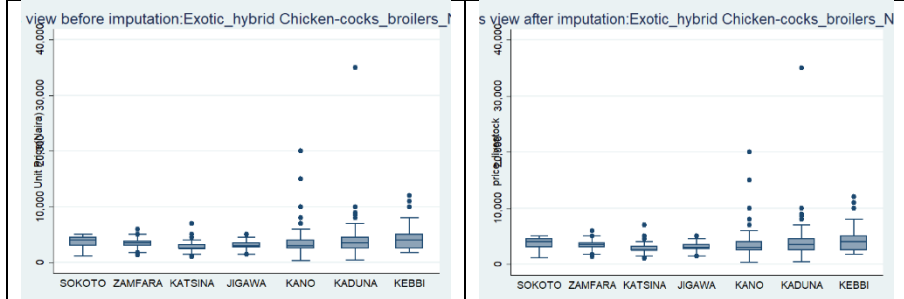
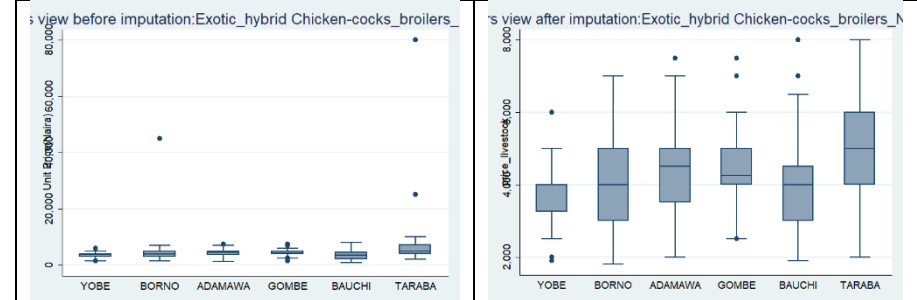
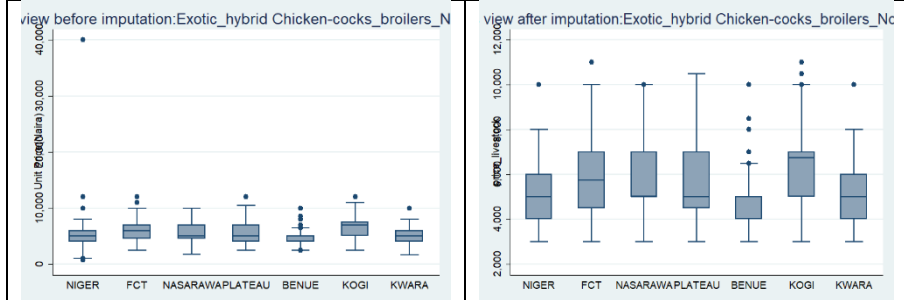
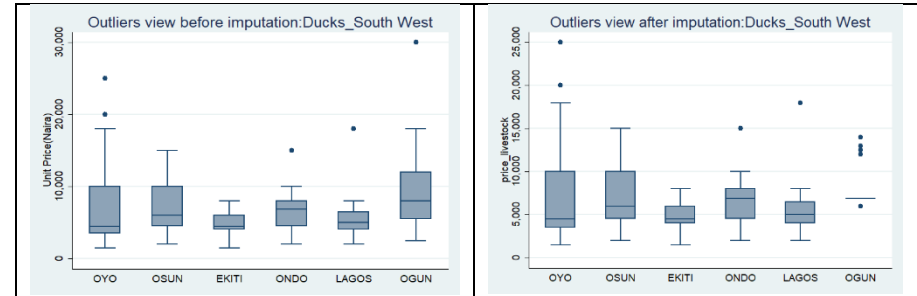
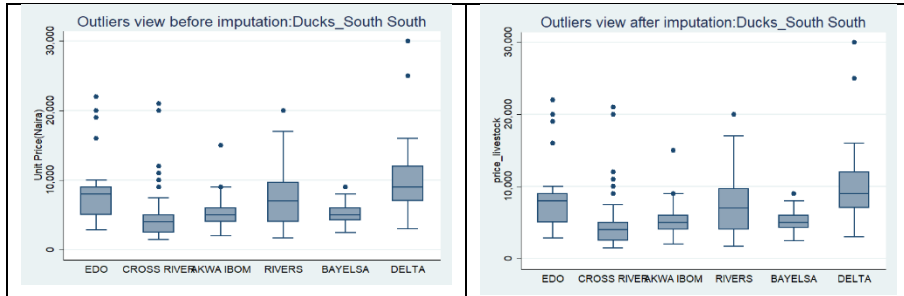
In depth analysis of Livestock price data, NASS



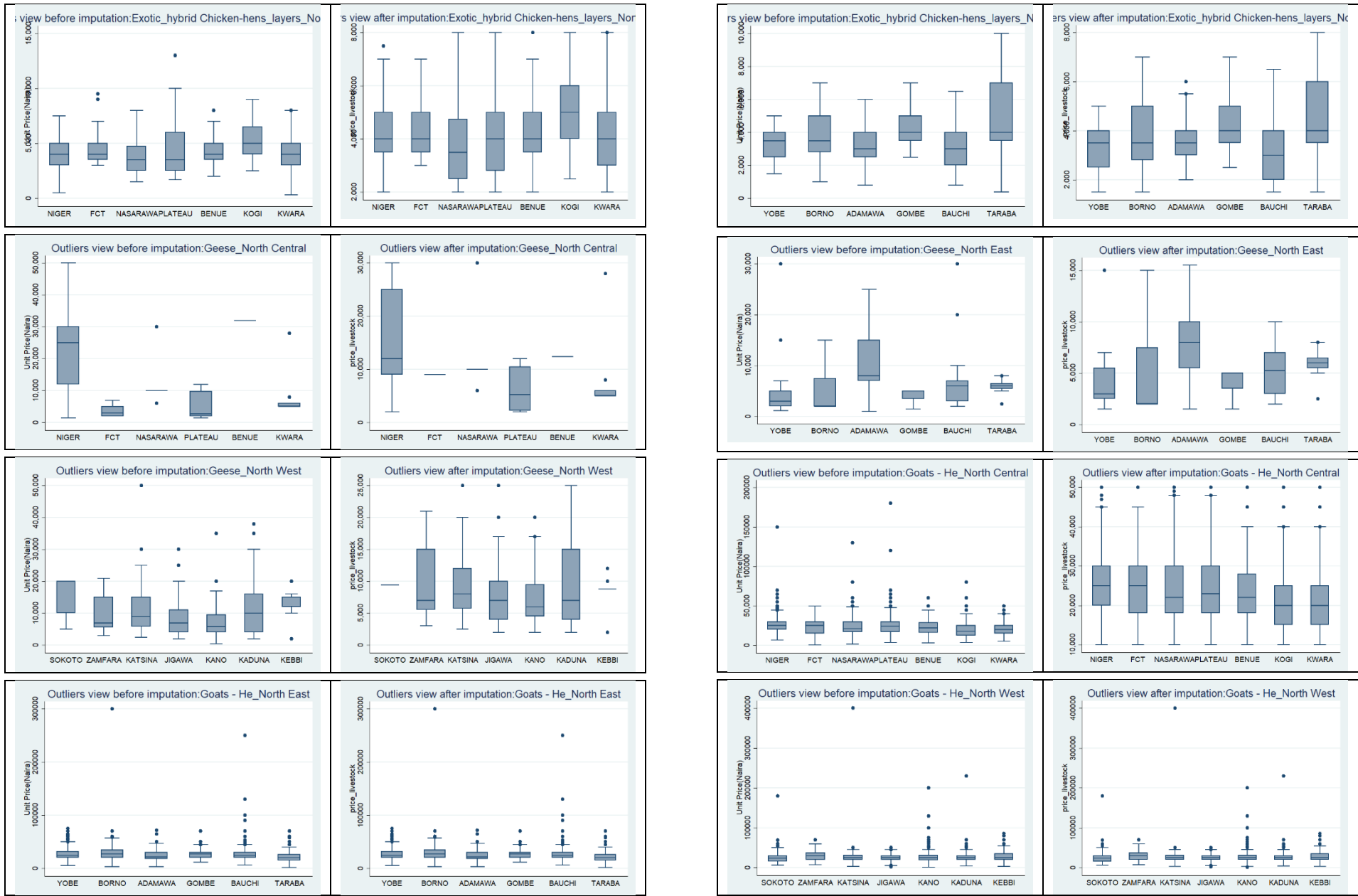
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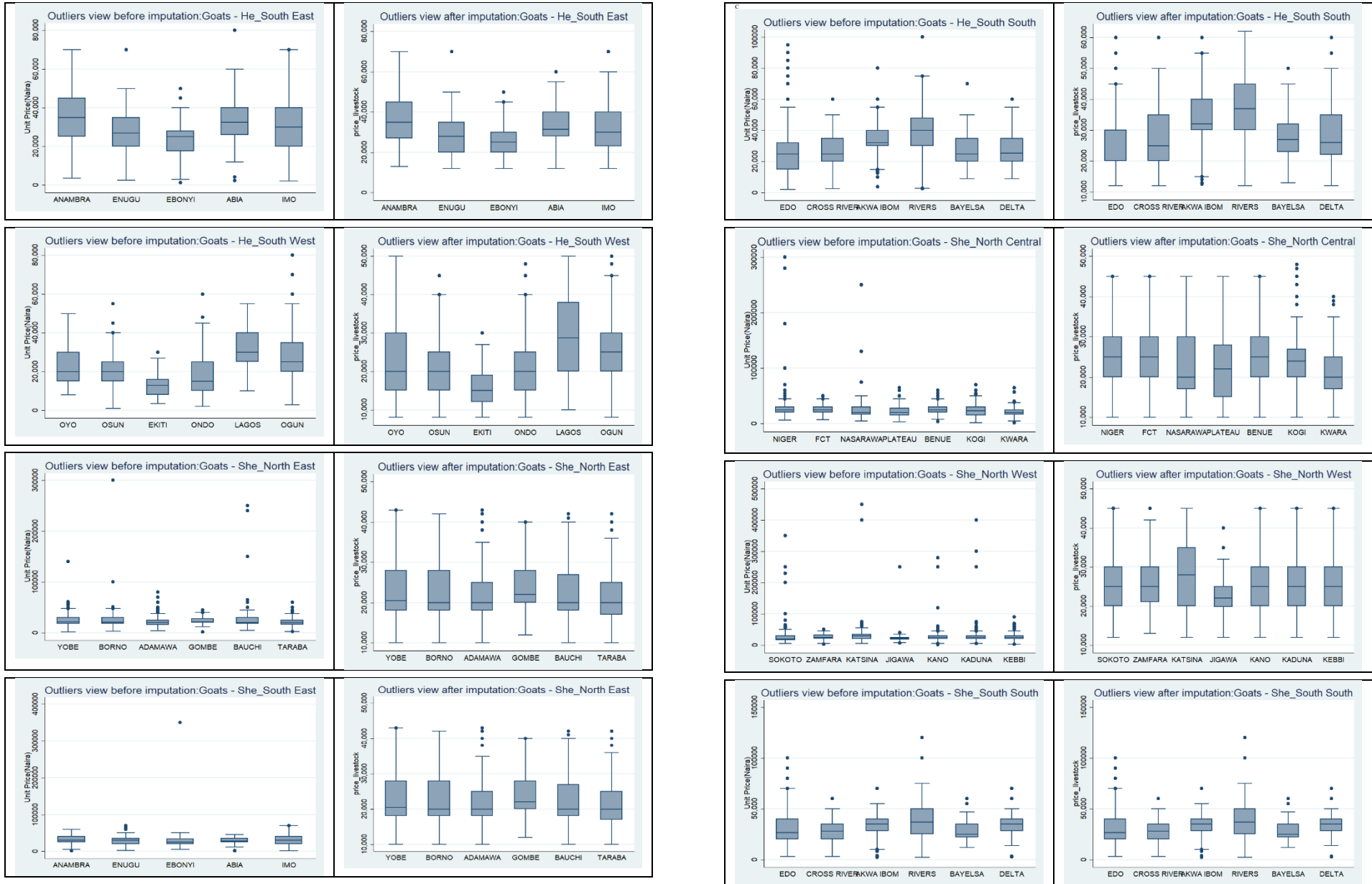
In depth analysis of Livestock price data, NASS



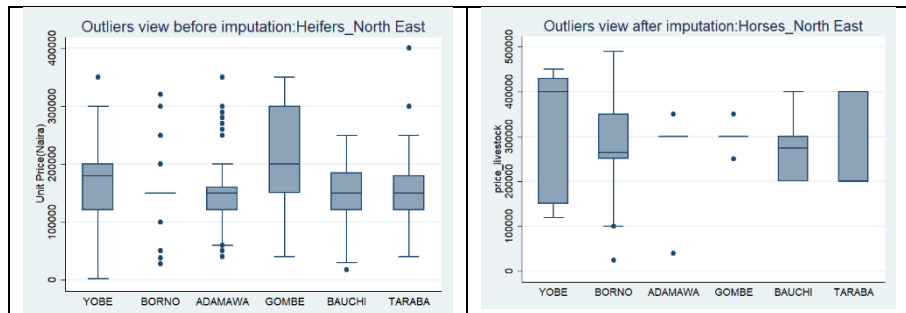
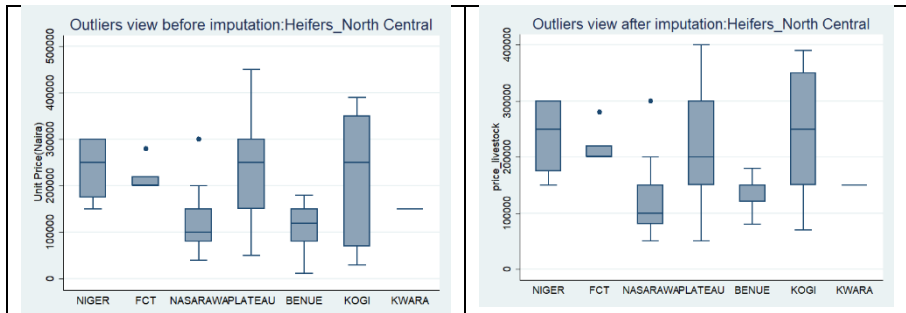
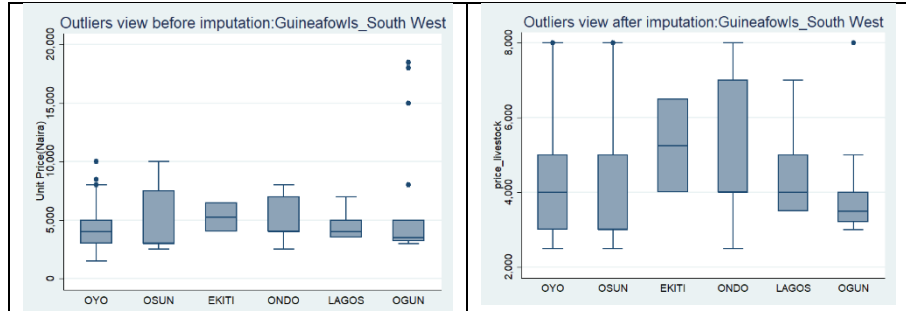
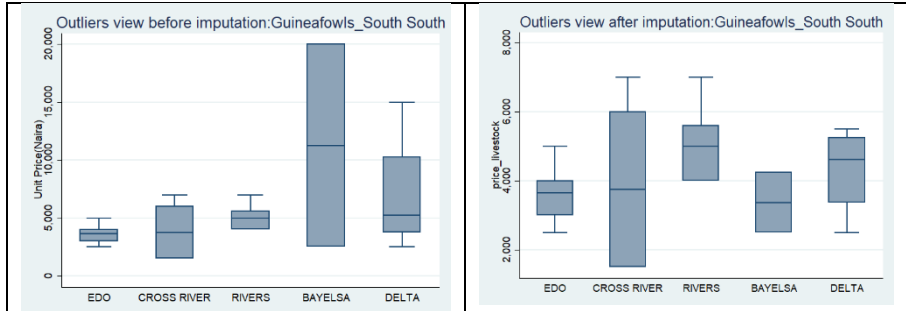
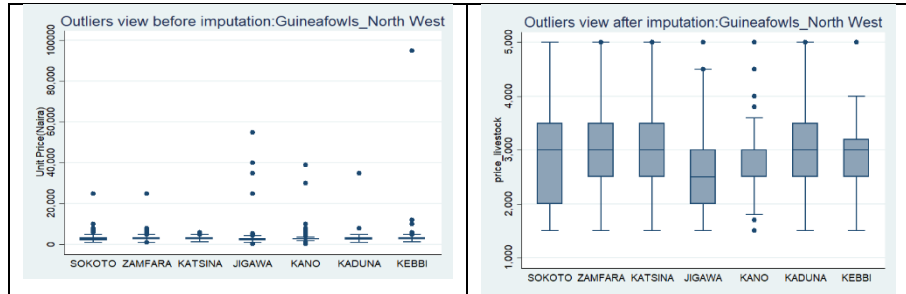
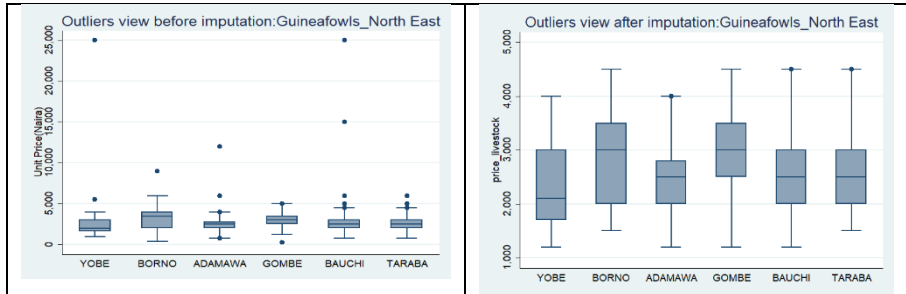
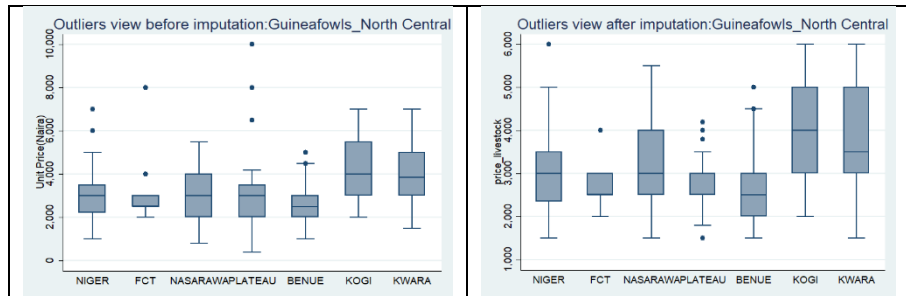
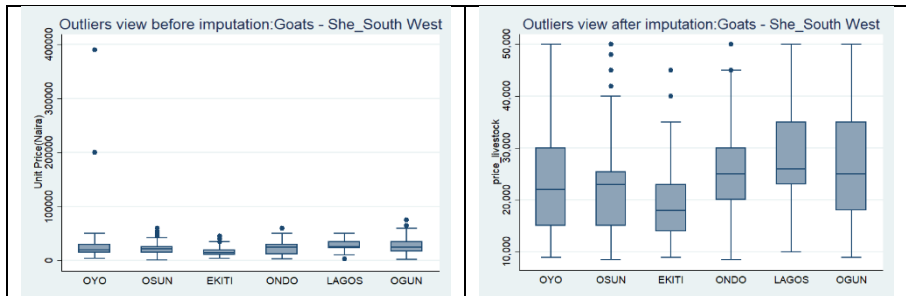
In depth analysis of Livestock price data, NASS



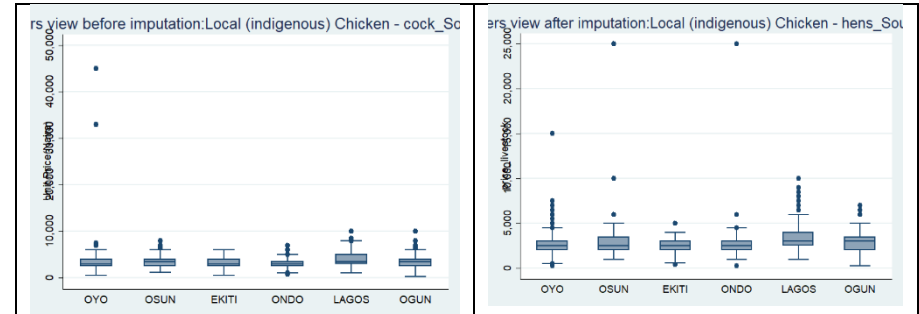
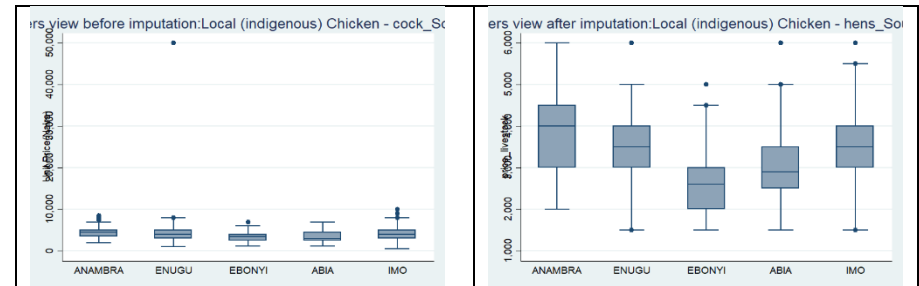
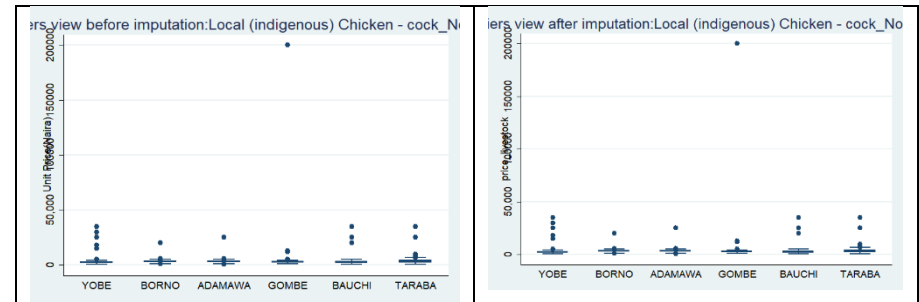
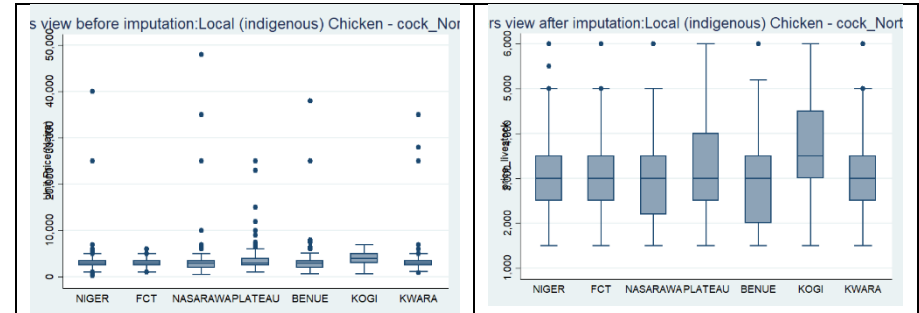
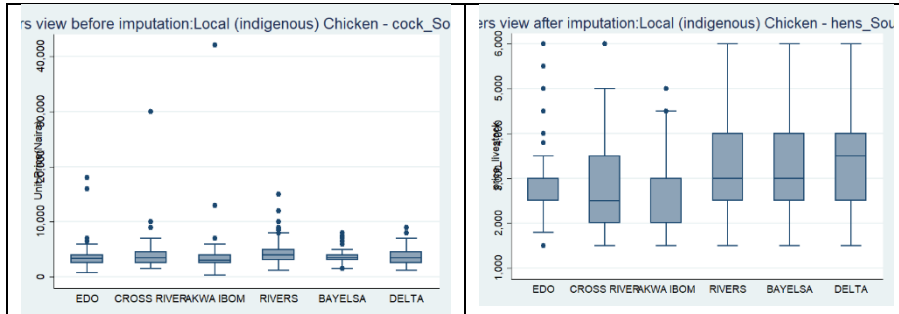
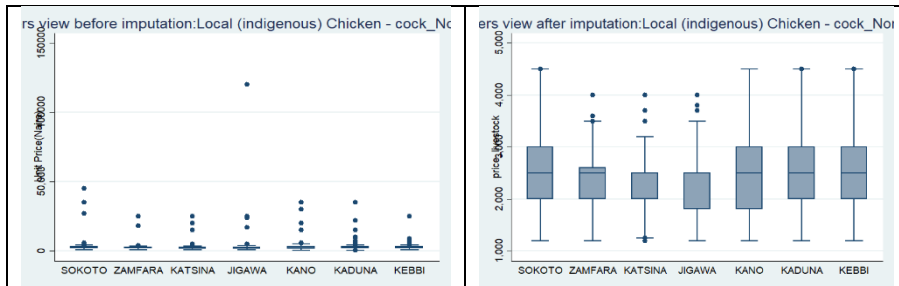
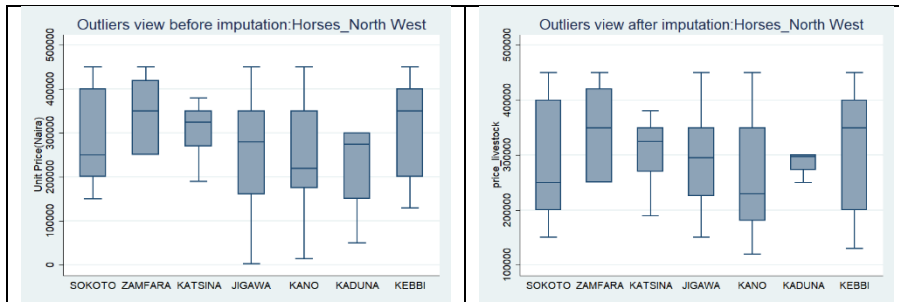
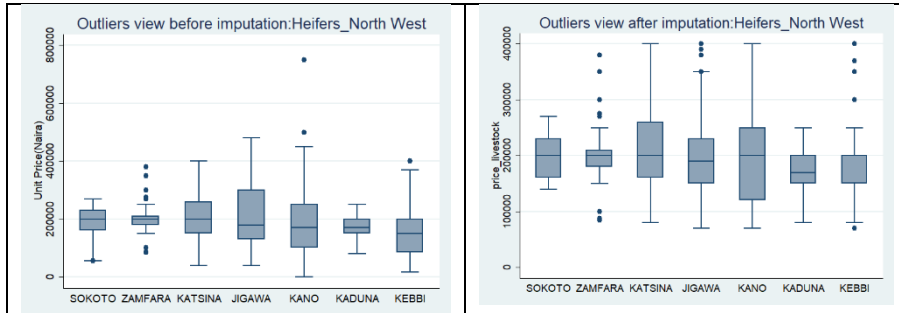
In depth analysis of Livestock price data, NASS



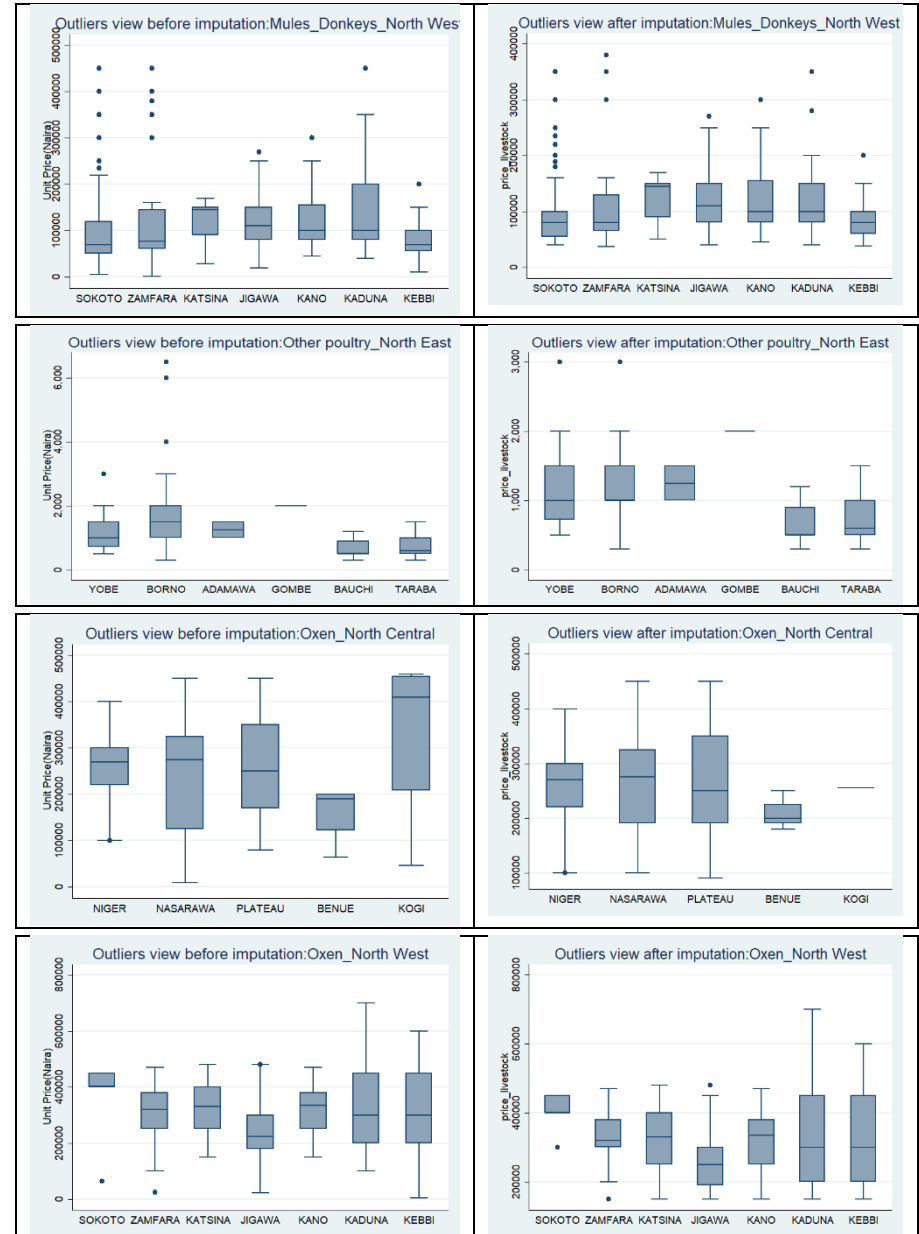
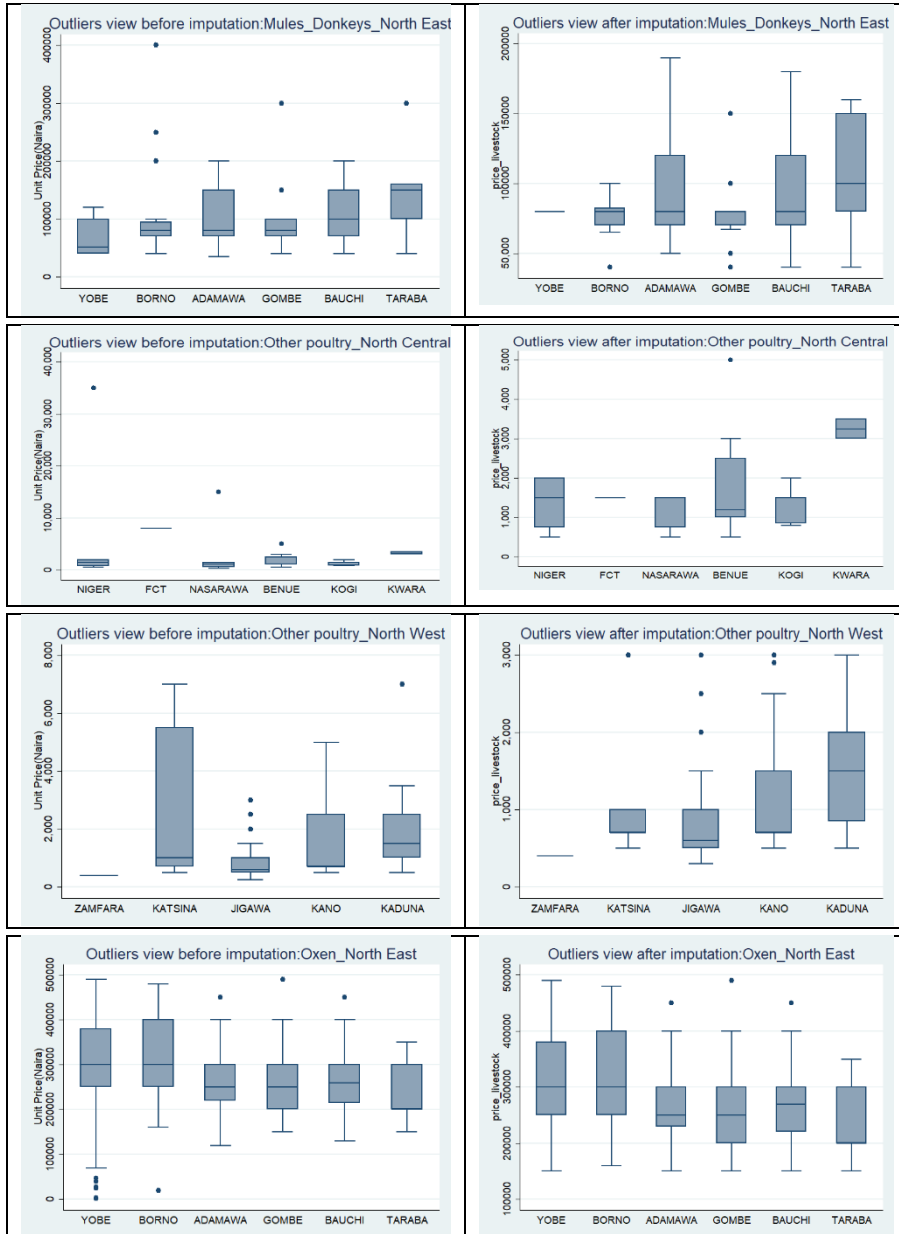
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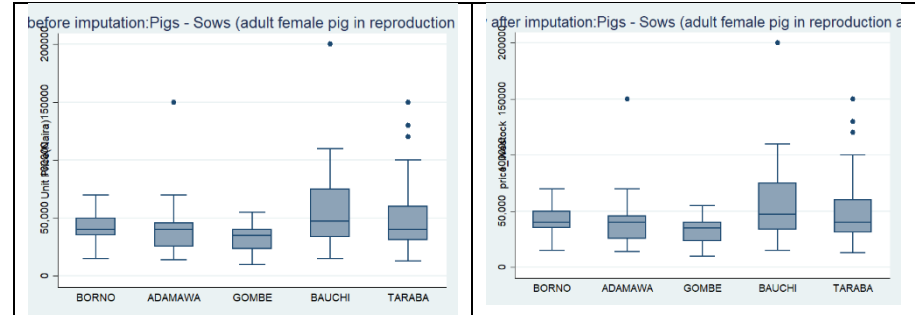
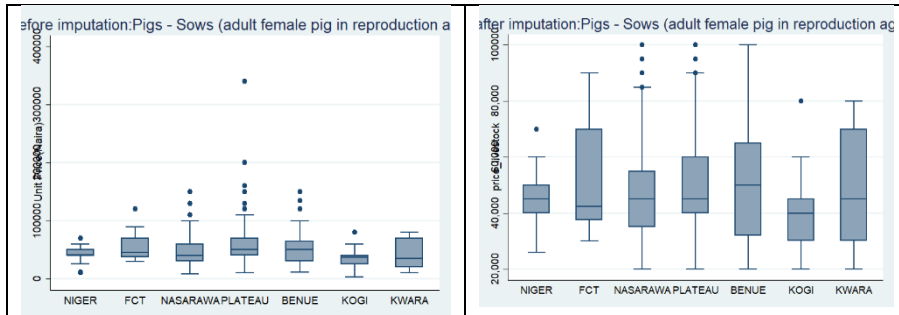
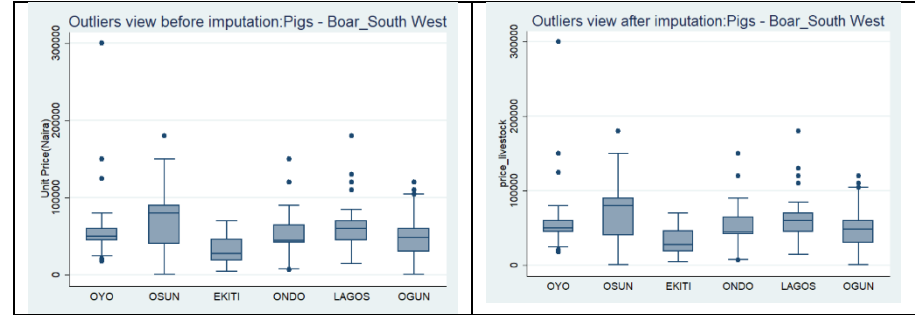
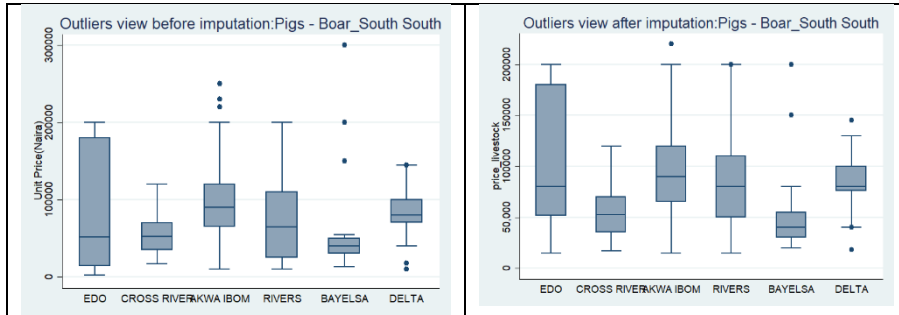
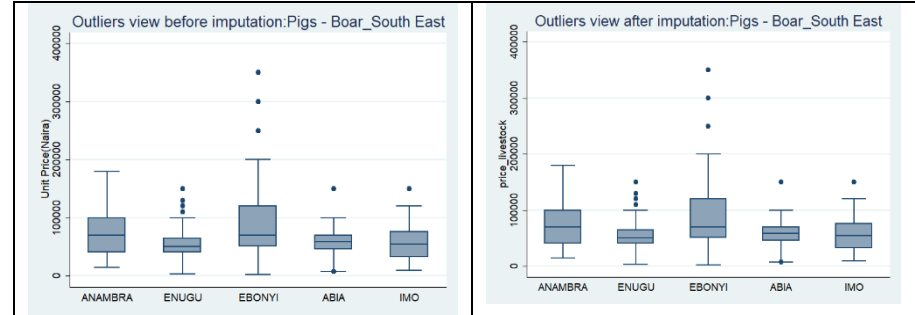
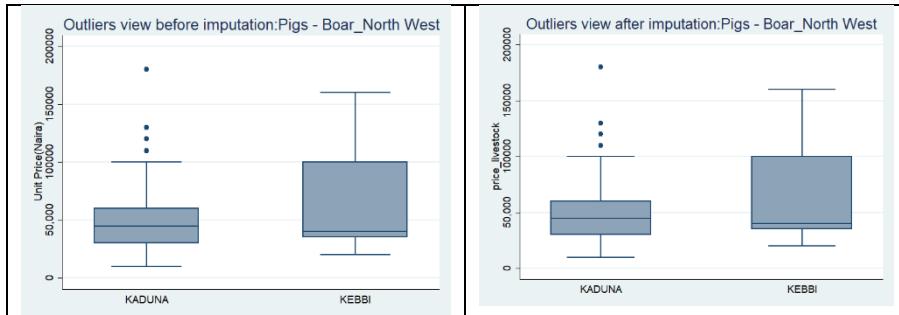
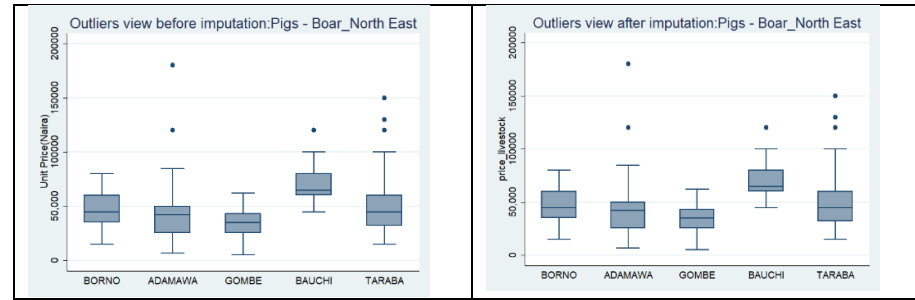
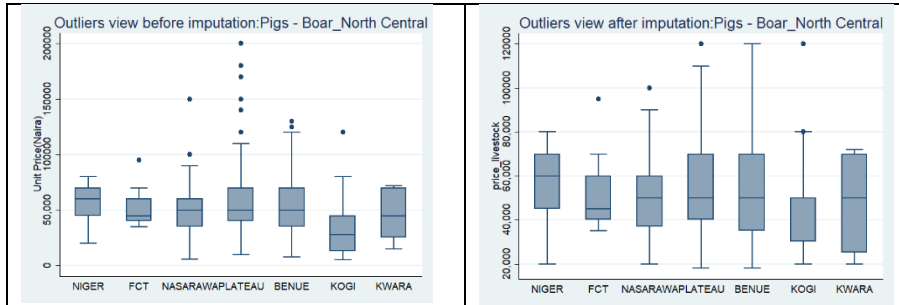
In depth analysis of Livestock price data, NASS



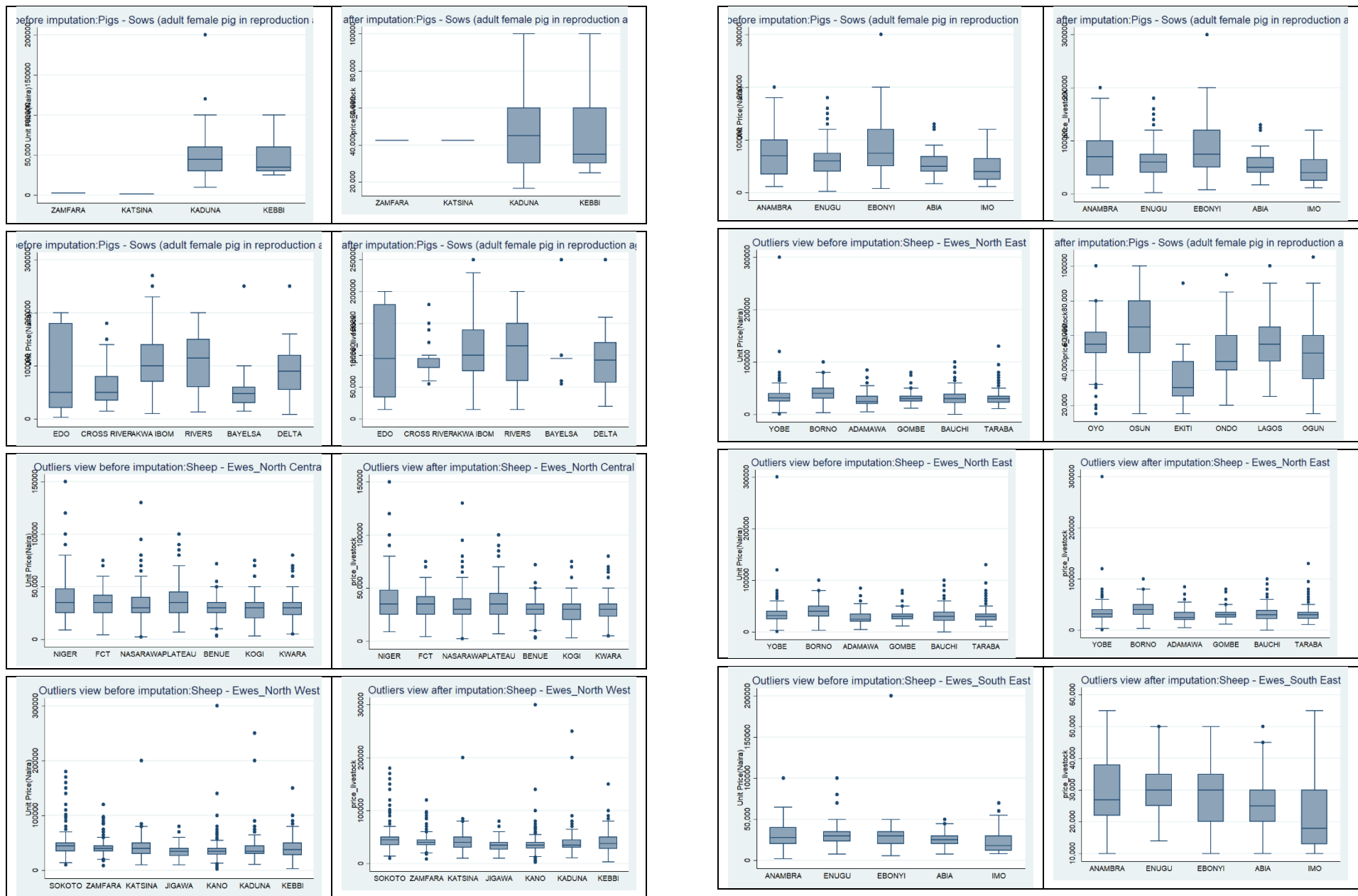
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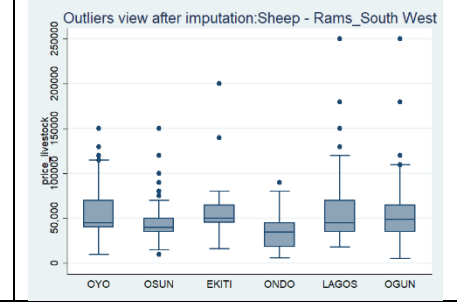
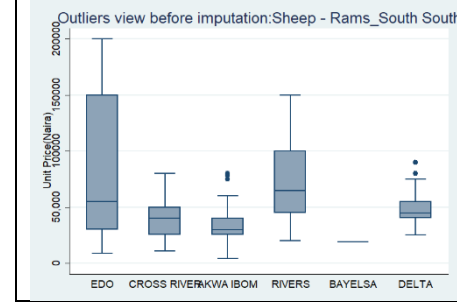
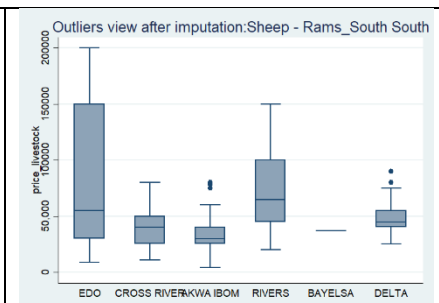
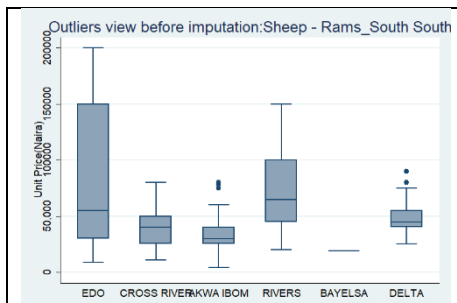
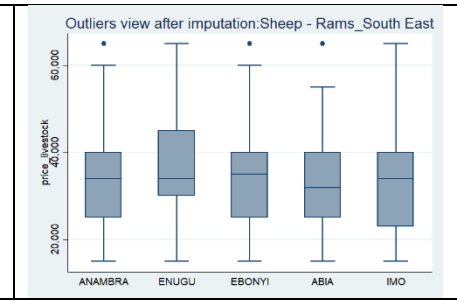
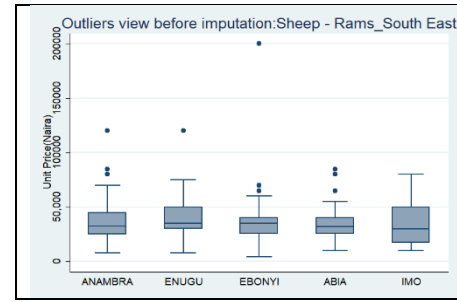
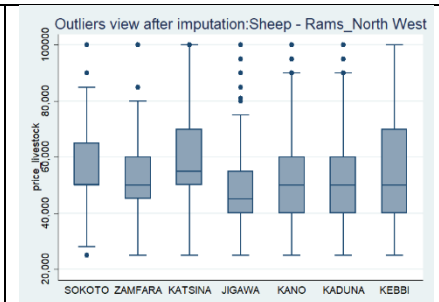
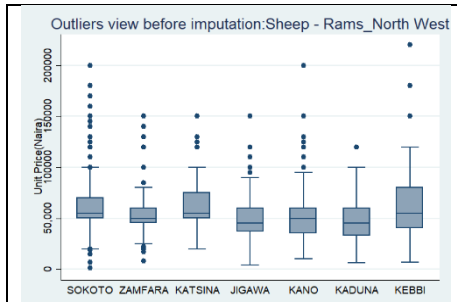
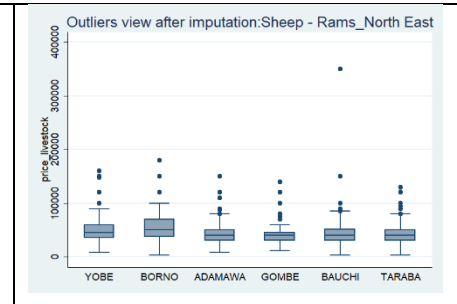
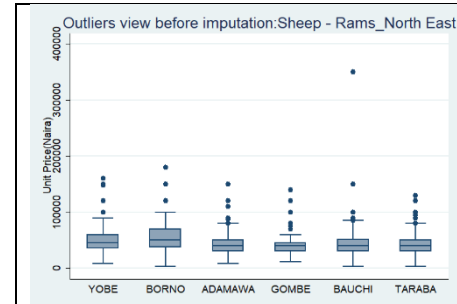
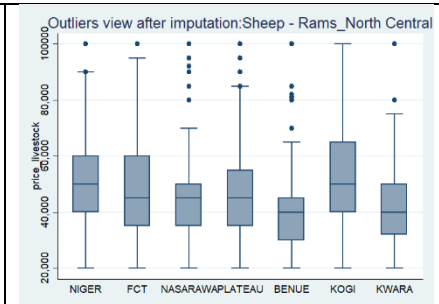
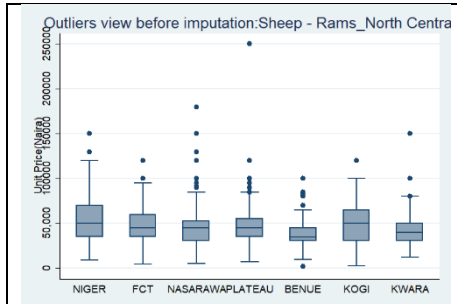
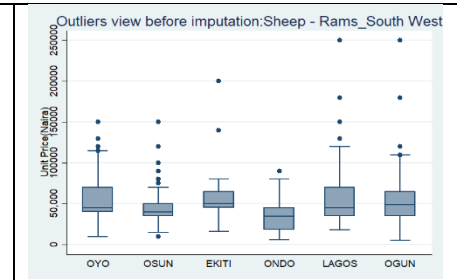
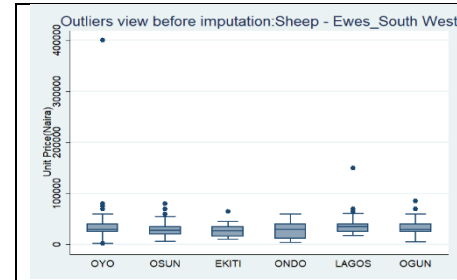
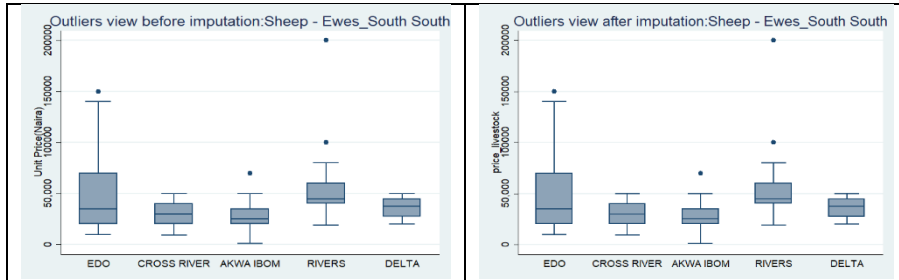
In depth analysis of Livestock price data, NASS



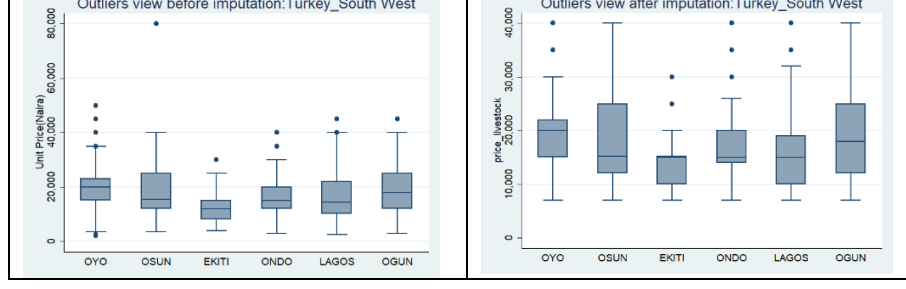
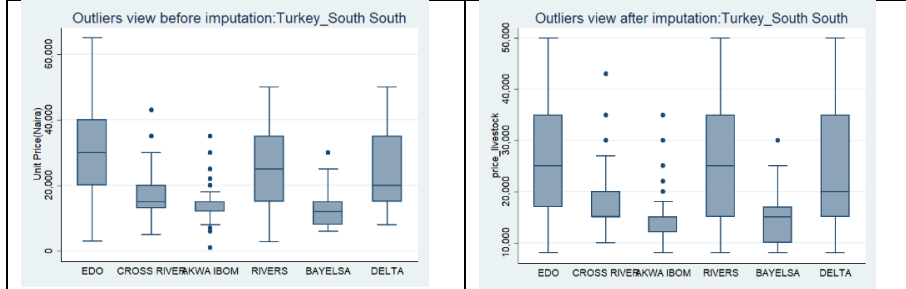
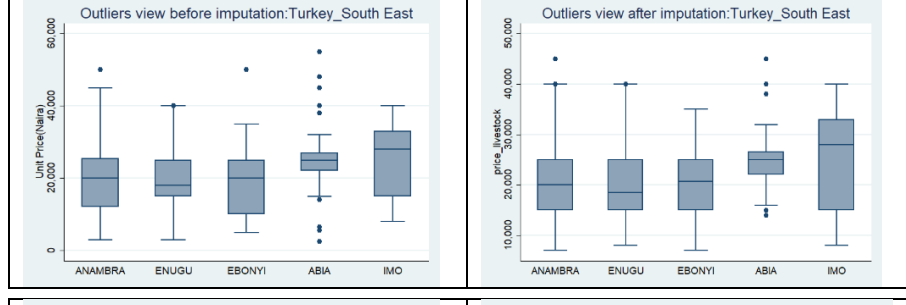
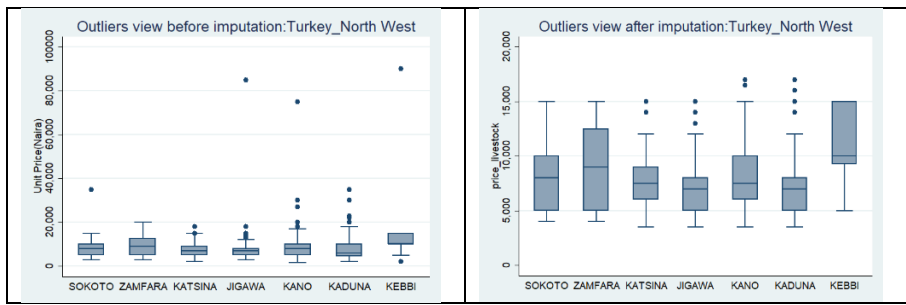
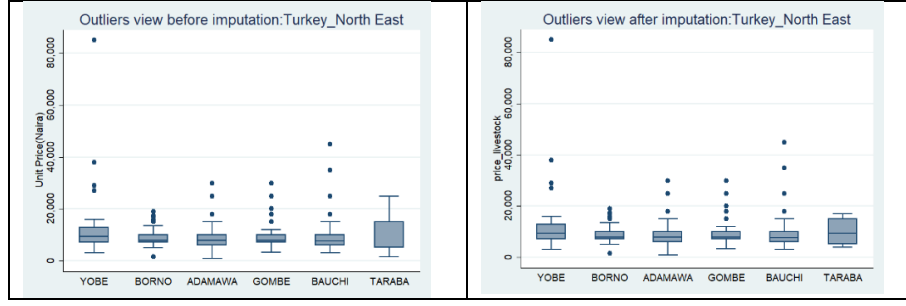
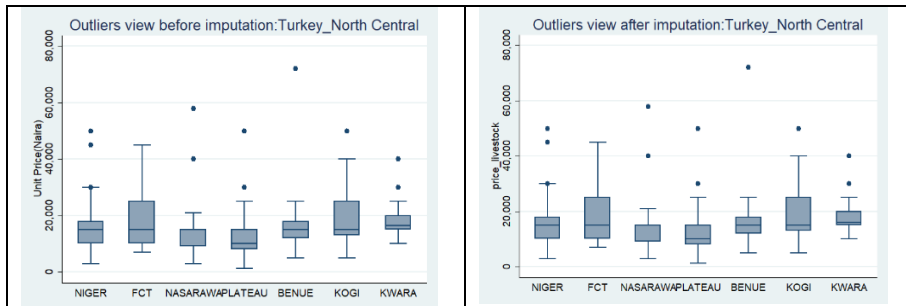
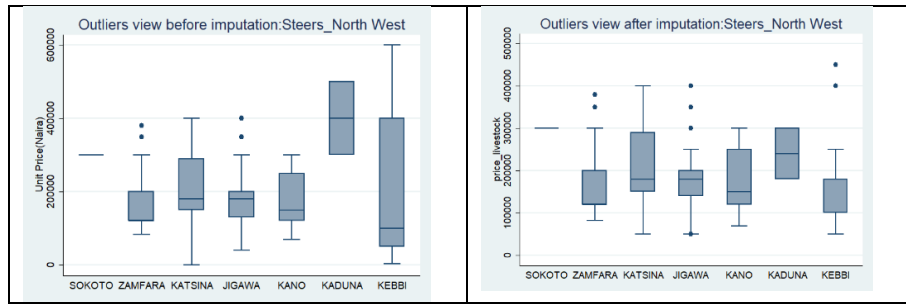
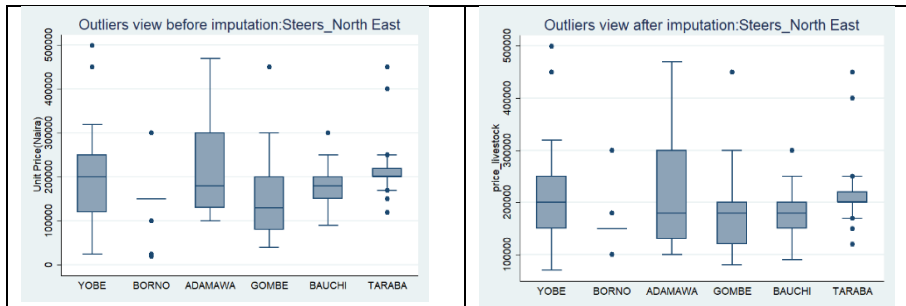
In depth analysis of Livestock price data, NASS



In depth analysis of Livestock price data, NASS



In depth analysis of Livestock price data, NASS



Appendix 2. By Livestock, multiple comparison test of mean prices between zones

Livestock	Reference zone	Zone for comparison	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Bulls	North Central	North East	-35688.81392'	4415.82	0	-48658	-22719
	North Central	North West	-61773.29939'	4315.33	0	-74448	-49099
	North Central	South East	-29429.22514	12734.24	0.313	-66830	7972
	North Central	South South	-27867.07396	24432.32	1	-99626	43891
	North Central	South West	20691.98698	8692.46	0.26	-4838	46222
	North East	North West	-26084.48547'	3274.31	0	-35701	-16468
	North East	South East	6259.58878	12420.14	1	-30219	42738
	North East	South South	7821.73996	24270.09	1	-63460	79104
	North East	South West	56380.80090'	8225.44	0	32222	80539
	North West	South East	32344.07425	12384.77	0.136	-4030	68719
	North West	South South	33906.22543	24252.01	1	-37323	105135
	North West	South West	82465.28637'	8171.93	0	58464	106466
	South East	South South	1562.15118	27049.93	1	-77884	81009
	South East	South West	50121.21212'	14502.39	0.008	7527	92715
South South	South West	48559.06094	25398.76	0.84	-26038	123156	
Oxen	North Central	North East	-30229.03734	10860.34	0.054	-60760	302
	North Central	North West	-52918.00076'	10817.50	0	-83328	-22508
	North Central	South East	-33791.91762	20801.28	1	-92269	24685
	North Central	South West	-66484.22531	39045.31	0.888	-176249	43281
	North East	North West	-22688.96342'	4968.34	0	-36656	-8722
	North East	South East	-3562.88028	18448.83	1	-55427	48301
	North East	South West	-36255.18797	37844.45	1	-142644	70134
	North West	South East	19126.08315	18423.64	1	-32667	70919
	North West	South West	-13566.22455	37832.18	1	-119921	92788
South East	South West	-32692.30769	41796.51	1	-150192	84807	
Cows - diary. others	North Central	North East	-7072.68683	3278.05	0.465	-16699	2553
	North Central	North West	-33489.47668'	3111.01	0	-42625	-24354
	North Central	South East	-37586.28596'	7834.89	0	-60593	-14579
	North Central	South South	-48141.15139'	14949.43	0.019	-92039	-4243
	North Central	South West	-4119.17336	5734.22	1	-20957	12719
	North East	North West	-26416.78986'	2796.08	0	-34627	-18206
	North East	South East	-30513.59913'	7715.26	0.001	-53169	-7858
	North East	South South	-41068.46456	14887.08	0.087	-84784	2647
	North East	South West	2953.51346	5569.64	1	-13401	19309
	North West	South East	-4096.80928	7645.78	1	-26548	18355
	North West	South South	-14651.6747	14851.19	1	-58262	28958
	North West	South West	29370.30332'	5472.99	0	13299	45442
	South East	South South	-10554.86542	16500.45	1	-59008	37898
	South East	South West	33467.11260'	9036.64	0.003	6931	60003
South South	South West	44021.97802	15612.84	0.072	-1824	89868	
Heifers	North Central	North East	-3184.74715	6661.74	1	-22774	16404
	North Central	North West	-40216.62152'	6736.19	0	-60025	-20409
	North Central	South East	-168480.76923'	14436.30	0	-210931	-126030
	North Central	South South	17750	30460.43	1	-71820	107320
	North Central	South West	-19250	14436.30	1	-61701	23201
	North East	North West	-37031.87438'	3940.56	0	-48619	-25444
	North East	South East	-165296.02209'	13362.58	0	-204589	-126003
	North East	South South	20934.74715	29966.48	1	-67183	109052
	North East	South West	-16065.25285	13362.58	1	-55358	23228
	North West	South East	-128264.14771'	13399.85	0	-167667	-88861
	North West	South South	57966.62152	29983.11	0.801	-30200	146133
	North West	South West	20966.62152	13399.85	1	-18436	60369
	South East	South South	186230.76923'	32588.61	0	90403	282059
	South East	South West	149230.76923'	18509.09	0	94804	203658
South South	South West	-37000	32588.61	1	-132828	58828	
Calves - Males/Females	North Central	North East	-10102.74163	4951.06	0.623	-24662	4457
	North Central	North West	-53296.63012'	4748.01	0	-67259	-39334
	North Central	South East	-37758.56036'	7998.86	0	-61281	-14236
	North Central	South South	-86639.24502'	12506.94	0	-123419	-49860
	North Central	South West	-16055.20833	9851.67	1	-45026	12916
	North East	North West	-43193.88850'	3686.36	0	-54034	-32353
	North East	South East	-27655.81873'	7418.04	0.003	-49470	-5842
North East	South South	-76536.50339'	12143.69	0	-112248	-40825	

	North East	South West	-5952.46671	9386.21	1	-33555	21650
	North West	South East	15538.06977	7284.09	0.497	-5882	36958
	North West	South South	-33342.61489	12062.33	0.087	-68814	2129
	North West	South West	37241.42179'	9280.71	0.001	9950	64533
	South East	South South	-48880.68466'	13672.52	0.005	-89088	-8674
	South East	South West	21703.35202	11294.68	0.823	-11511	54918
	South South	South West	70584.03668'	14832.78	0	26965	114203
Goats - She	North Central	North East	1381.92340'	240.23	0	677	2087
	North Central	North West	-1294.77913'	224.10	0	-1953	-637
	North Central	South East	-5873.85438'	294.98	0	-6740	-5008
	North Central	South South	-9382.14452'	308.75	0	-10289	-8476
	North Central	South West	-126.70289	277.84	1	-942	689
	North East	North West	-2676.70253'	230.85	0	-3354	-1999
	North East	South East	-7255.77778'	300.13	0	-8137	-6375
	North East	South South	-10764.06791'	313.68	0	-11685	-9843
	North East	South West	-1508.62629'	283.31	0	-2340	-677
	North West	South East	-4579.07525'	287.39	0	-5423	-3735
	North West	South South	-8087.36538'	301.51	0	-8973	-7202
	North West	South West	1168.07624'	269.77	0	376	1960
	South East	South South	-3508.29013'	357.35	0	-4557	-2459
	South East	South West	5747.15149'	331.01	0	4775	6719
South South	South West	9255.44162'	343.33	0	8247	10263	
Goats - He	North Central	North East	-2440.37567'	321.60	0	-3385	-1496
	North Central	North West	-2960.90334'	300.79	0	-3844	-2078
	North Central	South East	-7188.20792'	395.01	0	-8348	-6029
	North Central	South South	-8061.61165'	409.08	0	-9263	-6861
	North Central	South West	478.75666	370.52	1	-609	1567
	North East	North West	-520.52768	310.21	1	-1431	390
	North East	South East	-4747.83226'	402.22	0	-5929	-3567
	North East	South South	-5621.23599'	416.05	0	-6843	-4400
	North East	South West	2919.13233'	378.20	0	1809	4029
	North West	South East	-4227.30458'	385.79	0	-5360	-3095
	North West	South South	-5100.70831'	400.18	0	-6276	-3926
	North West	South West	3439.66000'	360.67	0	2381	4499
	South East	South South	-873.40373	475.08	0.99	-2268	521
	South East	South West	7666.96458'	442.31	0	6368	8965
South South	South West	8540.36831'	454.92	0	7205	9876	
Sheep - Ewes	North Central	North East	744.07951	517.44	1	-775	2263
	North Central	North West	-6197.95774'	480.78	0	-7610	-4786
	North Central	South East	6103.43448'	745.43	0	3915	8292
	North Central	South South	-2253.48302	952.04	0.269	-5049	542
	North Central	South West	3687.25041'	701.06	0	1629	5746
	North East	North West	-6942.03724'	471.68	0	-8327	-5557
	North East	South East	5359.35497'	739.59	0	3188	7531
	North East	South South	-2997.56253'	947.47	0.023	-5779	-216
	North East	South West	2943.17090'	694.85	0	903	4983
	North West	South East	12301.39222'	714.43	0	10204	14399
	North West	South South	3944.47472'	927.96	0	1220	6669
	North West	South West	9885.20814'	668.00	0	7924	11846
	South East	South South	-8356.91750'	1088.86	0	-11554	-5160
	South East	South West	-2416.18407	877.91	0.089	-4994	161
South South	South West	5940.73343'	1058.98	0	2832	9050	
Sheep - Rams	North Central	North East	331.50885	635.32	1	-1534	2197
	North Central	North West	-6455.78639'	595.94	0	-8205	-4706
	North Central	South East	12379.36609'	976.02	0	9514	15245
	North Central	South South	388.38337	1245.25	1	-3268	4044
	North Central	South West	-6077.81513'	869.49	0	-8631	-3525
	North East	North West	-6787.29524'	573.96	0	-8472	-5102
	North East	South East	12047.85724'	962.76	0	9221	14874
	North East	South South	56.87452	1234.88	1	-3569	3682
	North East	South West	-6409.32398'	854.58	0	-8918	-3900
	North West	South East	18835.15248'	937.24	0	16083	21587
	North West	South South	6844.16976'	1215.09	0	3277	10412
	North West	South West	377.97126	825.72	1	-2046	2802
	South East	South South	-11990.98273'	1440.11	0	-16219	-7763
	South East	South West	-18457.18122'	1131.06	0	-21778	-15136
South South	South West	-6466.19849'	1370.15	0	-10489	-2443	

In depth analysis of Livestock price data, NASS

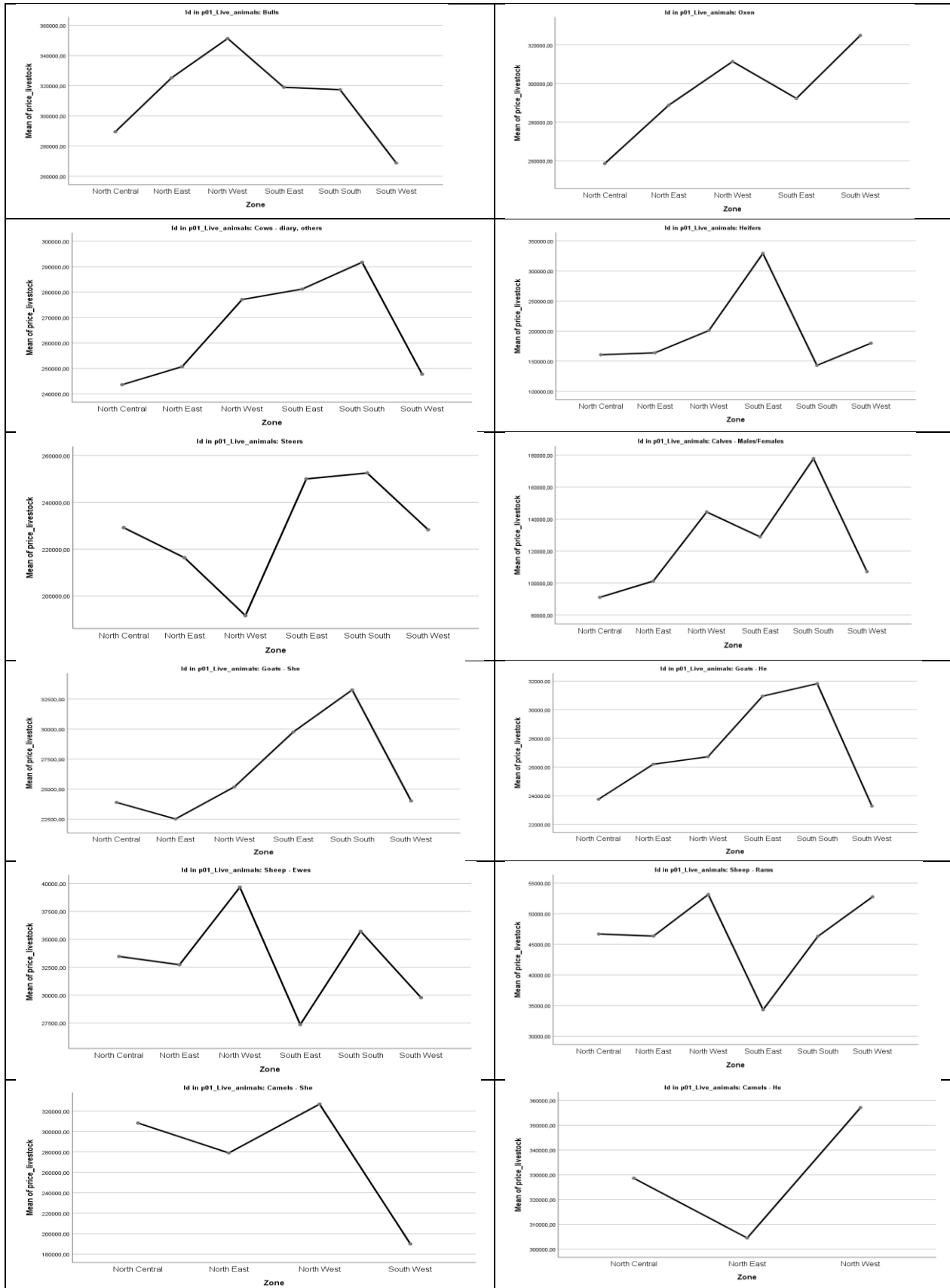
Camels - He	North Central	North East	24103.34347	29110.50	1	-45815	94021
	North Central	North West	-28498.44042	25940.11	0.817	-90802	33805
	North East	North West	-52601.78389	14644.07	0.001	-87774	-17430
Pigs - Sows (adult female pig in reproduction age)	North Central	North East	4652.06514	1962.86	0.268	-1114	10418
	North Central	North West	3577.2974	2999.67	1	-5235	12389
	North Central	South East	-18312.51747	1729.92	0	-23394	-13231
	North Central	South South	-53464.15366	1748.33	0	-58600	-48328
	North Central	South West	-2795.93214	1883.10	1	-8328	2736
	North East	North West	-1074.76774	3253.93	1	-10634	8484
	North East	South East	-22964.58260	2140.71	0	-29253	-16676
	North East	South South	-58116.21880	2155.62	0	-64449	-51784
	North East	South West	-7447.99728	2266.30	0.015	-14106	-790
	North West	South East	-21889.81487	3118.95	0	-31052	-12727
	North West	South South	-57041.45106	3129.20	0	-66234	-47849
	North West	South West	-6373.22954	3206.45	0.704	-15793	3046
	South East	South South	-35151.63620	1945.90	0	-40868	-29435
	South East	South West	15516.58533	2067.83	0	9442	21591
	South South	South West	50668.22152	2083.26	0	44548	56788
Pigs - Boar	North Central	North East	6523.71168	2202.75	0.046	52	12995
	North Central	North West	1701.04287	3244.87	1	-7832	11234
	North Central	South East	-15746.44140	1900.22	0	-21329	-10164
	North Central	South South	-33427.84159	1869.50	0	-38920	-27936
	North Central	South West	-1211.8212	1994.42	1	-7071	4647
	North East	North West	-4822.66881	3579.18	1	-15338	5692
	North East	South East	-22270.15309	2427.39	0	-29401	-15139
	North East	South South	-39951.55327	2403.42	0	-47012	-32891
	North East	South West	-7735.53289	2501.82	0.03	-15085	-386
	North West	South East	-17447.48428	3401.37	0	-27440	-7455
	North West	South South	-35128.88446	3384.30	0	-45071	-25186
	North West	South West	-2912.86408	3454.88	1	-13063	7237
	South East	South South	-17681.40019	2129.59	0	-23938	-11425
	South East	South West	14534.62020	2240.06	0	7954	21116
	South South	South West	32216.02038	2214.06	0	25711	38721
Exotic/hybrid Chicken - hens / layers	North Central	North East	522.01508	120.41	0	168	876
	North Central	North West	1027.94268	115.77	0	688	1368
	North Central	South East	-218.71704	108.96	0.672	-539	101
	North Central	South South	-451.68236	105.96	0	-763	-141
	North Central	South West	-190.76322	108.34	1	-509	127
	North East	North West	505.92760	119.20	0	156	856
	North East	South East	-740.73212	112.60	0	-1071	-410
	North East	South South	-973.69744	109.70	0	-1296	-652
	North East	South West	-712.77830	112.00	0	-1042	-384
	North West	South East	-1246.65971	107.62	0	-1563	-931
	North West	South South	-1479.62504	104.58	0	-1787	-1172
	North West	South West	-1218.70589	106.99	0	-1533	-904
	South East	South South	-232.96532	96.99	0.245	-518	52
	South East	South West	27.95382	99.59	1	-265	320
	South South	South West	260.91914	96.29	0.101	-22	544
Exotic/hybrid Chicken - cocks / broilers	North Central	North East	1207.11405	114.66	0	870	1544
	North Central	North West	1862.99450	105.51	0	1553	2173
	North Central	South East	-343.68826	101.83	0.011	-643	-45
	North Central	South South	-1571.88561	99.76	0	-1865	-1279
	North Central	South West	-1331.18382	95.97	0	-1613	-1049
	North East	North West	655.88045	114.55	0	320	992
	North East	South East	-1550.80231	111.17	0	-1877	-1224
	North East	South South	-2778.99966	109.28	0	-3100	-2458
	North East	South West	-2538.29786	105.83	0	-2849	-2228
	North West	South East	-2206.68276	101.70	0	-2505	-1908
	North West	South South	-3434.88011	99.63	0	-3727	-3142
	North West	South West	-3194.17832	95.83	0	-3476	-2913
	South East	South South	-1228.19735	95.72	0	-1509	-947
	South East	South West	-987.49555	91.76	0	-1257	-718
	South South	South West	240.7018	89.46	0.107	-22	503
Local (indigenous) Chicken - hens	North Central	North East	285.18775	25.58	0	210	360
	North Central	North West	460.90174	23.90	0	391	531
	North Central	South East	-886.64201	31.40	0	-979	-794
	North Central	South South	-650.87982	31.13	0	-742	-559

	North Central	South West	-435.07235 [*]	28.37	0	-518	-352
	North East	North West	175.71399 [*]	24.89	0	103	249
	North East	South East	-1171.82976 [*]	32.16	0	-1266	-1077
	North East	South South	-936.06756 [*]	31.90	0	-1030	-842
	North East	South West	-720.26010 [*]	29.21	0	-806	-635
	North West	South East	-1347.54375 [*]	30.83	0	-1438	-1257
	North West	South South	-1111.78156 [*]	30.56	0	-1202	-1022
	North West	South West	-895.97409 [*]	27.74	0	-977	-815
	South East	South South	235.76220 [*]	36.73	0	128	344
	South East	South West	451.56966 [*]	34.42	0	351	553
	South South	South West	215.80746 [*]	34.17	0	115	316
	Local (indigenous) Chicken - cock	North Central	North East	240.06196 [*]	64.40	0.003	51
North Central		North West	729.42161 [*]	59.91	0	554	905
North Central		South East	-867.94888 [*]	77.84	0	-1096	-639
North Central		South South	-556.99266 [*]	77.82	0	-785	-329
North Central		South West	-248.94750 [*]	70.90	0.007	-457	-41
North East		North West	489.35965 [*]	62.44	0	306	673
North East		South East	-1108.01084 [*]	79.80	0	-1342	-874
North East		South South	-797.05462 [*]	79.78	0	-1031	-563
North East		South West	-489.00946 [*]	73.05	0	-703	-275
North West		South East	-1597.37049 [*]	76.22	0	-1821	-1374
North West		South South	-1286.41427 [*]	76.20	0	-1510	-1063
North West		South West	-978.36911 [*]	69.12	0	-1181	-775
South East		South South	310.95622 [*]	90.97	0.009	44	578
South East		South West	619.00138 [*]	85.13	0	369	869
South South		South West	308.04516 [*]	85.11	0.004	58	558
Turkey	North Central	North East	6237.97370 [*]	380.67	0	5120	7356
	North Central	North West	7365.65898 [*]	356.79	0	6318	8414
	North Central	South East	-6776.27341 [*]	415.47	0	-7996	-5556
	North Central	South South	-5891.40836 [*]	433.71	0	-7165	-4618
	North Central	South West	-2844.07106 [*]	379.20	0	-3958	-1730
	North East	North West	1127.68528 [*]	343.07	0.015	120	2135
	North East	South East	-13014.24711 [*]	403.74	0	-14200	-11828
	North East	South South	-12129.38207 [*]	422.49	0	-13370	-10889
	North East	South West	-9082.04476 [*]	366.32	0	-10158	-8006
	North West	South East	-14141.93239 [*]	381.31	0	-15262	-13022
	North West	South South	-13257.06734 [*]	401.11	0	-14435	-12079
	North West	South West	-10209.73004 [*]	341.44	0	-11213	-9207
	South East	South South	884.86504	454.09	0.771	-449	2219
	South East	South West	3932.20234 [*]	402.36	0	2750	5114
	South South	South West	3047.33730 [*]	421.17	0	1810	4284
Ducks	North Central	North East	690.19270 [*]	80.07	0	455	925
	North Central	North West	625.74796 [*]	80.30	0	390	862
	North Central	South East	-1803.68243 [*]	169.29	0	-2301	-1307
	North Central	South South	-2761.20921 [*]	125.03	0	-3128	-2394
	North Central	South West	-2827.60646 [*]	116.15	0	-3169	-2487
	North East	North West	-64.44474	75.78	1	-287	158
	North East	South East	-2493.87512 [*]	167.19	0	-2985	-2003
	North East	South South	-3451.40191 [*]	122.18	0	-3810	-3093
	North East	South West	-3517.79916 [*]	113.07	0	-3850	-3186
	North West	South East	-2429.43038 [*]	167.31	0	-2921	-1938
	North West	South South	-3386.95717 [*]	122.33	0	-3746	-3028
	North West	South West	-3453.35442 [*]	113.24	0	-3786	-3121
	South East	South South	-957.52679 [*]	192.81	0	-1524	-391
	South East	South West	-1023.92403 [*]	187.17	0	-1574	-474
	South South	South West	-66.39725	148.35	1	-502	369
Guineafowls	North Central	North East	657.74738 [*]	44.15	0	528	787
	North Central	North West	253.88160 [*]	40.92	0	134	374
	North Central	South East	-1386.25421 [*]	165.01	0	-1871	-902
	North Central	South South	-1120.32828 [*]	144.06	0	-1543	-697
	North Central	South West	-1112.99968 [*]	79.28	0	-1346	-880
	North East	North West	-403.86578 [*]	31.22	0	-496	-312
	North East	South East	-2044.00159 [*]	162.88	0	-2522	-1566
	North East	South South	-1778.07566 [*]	141.61	0	-2194	-1362
	North East	South West	-1770.74706 [*]	74.73	0	-1990	-1551
North West	South East	-1640.13581 [*]	162.03	0	-2116	-1164	
North West	South South	-1374.20988 [*]	140.63	0	-1787	-961	

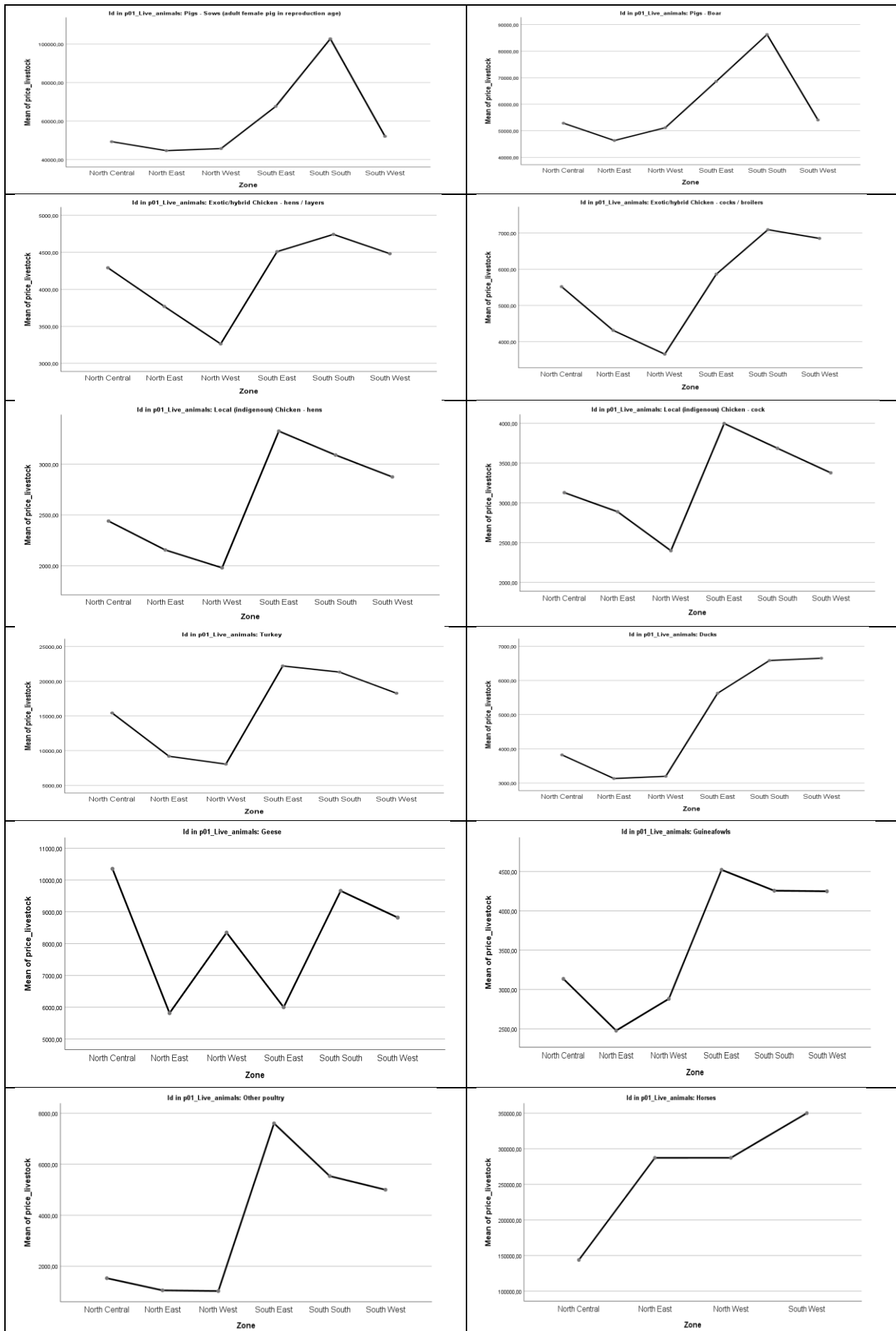
	North West	South West	-1366.88128*	72.87	0	-1581	-1153
	South East	South South	265.92593	212.91	1	-359	891
	South East	South West	273.25453	175.68	1	-243	789
	South South	South West	7.32861	156.17	1	-451	466
Other poultry	North Central	North East	476.49351	319.76	1	-473	1426
	North Central	North West	503.82488	293.26	1	-367	1375
	North Central	South East	-6067.14286*	511.18	0	-7586	-4549
	North Central	South South	-4000.47619*	653.44	0	-5942	-2059
	North Central	South West	-3467.14286*	612.30	0	-5286	-1648
	North East	North West	27.33138	251.55	1	-720	775
	North East	South East	-6543.63636*	488.45	0	-7995	-5093
	North East	South South	-4476.96970*	635.82	0	-6366	-2588
	North East	South West	-3943.63636*	593.46	0	-5707	-2181
	North West	South East	-6570.96774*	471.52	0	-7972	-5170
	North West	South South	-4504.30108*	622.91	0	-6355	-2654
	North West	South West	-3970.96774*	579.61	0	-5693	-2249
	South East	South South	2066.66667	750.54	0.097	-163	4296
	South East	South West	2600.00000*	715.01	0.005	476	4724
	South South	South West	533.33333	822.75	1	-1911	2977
	Rabbit	North Central	North West	3831.63269	3393.24	1	-5753
North Central		South South	4000	5183.25	1	-10641	18641
North Central		South West	-4321.42857	3393.24	1	-13906	5263
North West		South South	168.36731	4524.31	1	-12611	12948
North West		South West	-8153.06126*	2262.16	0.007	-14543	-1763
South South		South West	-8321.42857	4524.31	0.455	-21101	4458

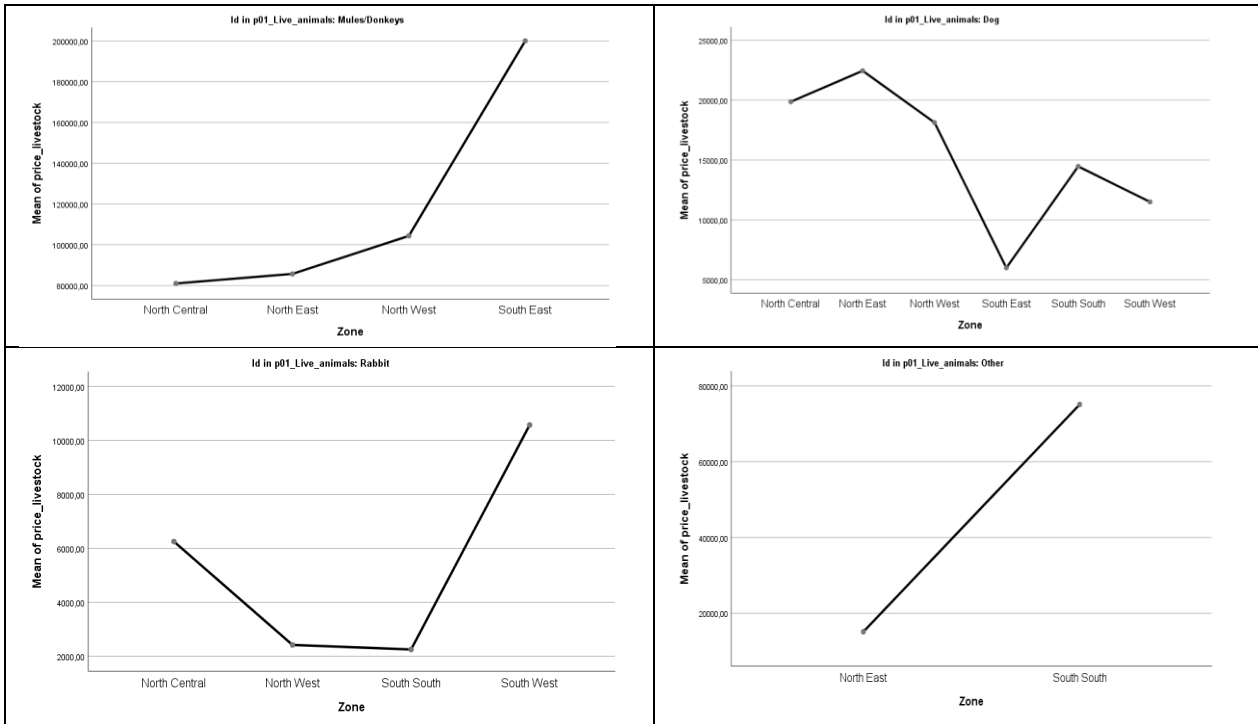
*. The mean difference is significant at the 0.05 level.

Appendix 3. : Graph of evolution of means of price by zone and by Livestock



In depth analysis of Livestock price data, NASS





Appendix 4. : T-test made by Livestock to compare mean of price by sector

Livestock	Means	Equal variances assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means					95% IC	
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Bulls	URBAN = 323112 RURAL = 330961	YES	0.20	0.652	-2.33	3862	0.020	-7850	3375	-14466	-1233
					-2.33	1899	0.020	-7850	3368	-14454	-1245
Oxen	URBAN = 300334 RURAL = 297455	NO	10.10	0.002	0.52	1493	0.602	2878	5520	-7950	13707
					0.56	755	0.579	2878	5182	-7294	13051
Cows - diary. others	URBAN = 260540 RURAL = 260560	YES	0.83	0.363	-0.01	5626	0.994	-21	2642	-5199	5158
					-0.01	2809	0.994	-21	2629	-5176	5135
Heifers	URBAN = 188258 RURAL = 179956	YES	0.20	0.655	1.85	1327	0.065	8303	4493	-511	17117
					1.87	623	0.063	8303	4450	-436	17042
Steers	URBAN = 211033 RURAL = 204530	YES	0.54	0.464	0.68	523	0.495	6503	9526	-12212	25218
					0.69	286	0.493	6503	9482	-12159	25166
Calves - Males/Females	URBAN = 116602 RURAL = 123118	YES	1.04	0.307	-1.73	1287	0.083	-6516	3761	-13894	862
					-1.74	703	0.082	-6516	3737	-13852	821
Goats - She	URBAN = 26821 RURAL = 24455	NO	198.10	0.000	14.10	12384	0.000	2366	168	2037	2695
					13.53	9091	0.000	2366	175	2023	2709
Goats - He	URBAN = 27294 RURAL = 25846	NO	24.58	0.000	6.63	12172	0.000	1448	218	1020	1876
					6.60	10335	0.000	1448	219	1018	1878
Sheep - Ewes	URBAN = 34397 RURAL = 34819	YES	0.08	0.776	-1.11	8518	0.266	-422	379	-1165	322
					-1.11	6070	0.269	-422	381	-1169	326
Sheep - Rams	URBAN = 49302 RURAL = 48059	NO	45.05	0.000	2.65	9181	0.008	1242	469	324	2161
					2.53	5773	0.012	1242	492	278	2207
Camels - She	URBAN = 304521 RURAL = 323720	YES	0.79	0.374	-1.63	452	0.105	-19199	11817	-42421	4024
					-1.63	102	0.107	-19199	11794	-42593	4196
Camels - He	URBAN = 354773 RURAL = 350878	NO	5.75	0.017	0.34	517	0.731	3896	11320	-18343	26134
					0.37	133	0.715	3896	10652	-17174	24965
Pigs - Sows (adult female pig in repr age)	URBAN = 69810 RURAL = 55681	NO	116.11	0.000	10.15	2867	0.000	14129	1392	11400	16858
					9.90	2362	0.000	14129	1427	11330	16928
Pigs - Boar	URBAN = 66147 RURAL = 57226	NO	62.43	0.000	6.44	2683	0.000	8921	1385	6205	11637
					6.28	2239	0.000	8921	1420	6136	11706
Exotic/hybrid Chicken - hens / layers	URBAN = 4354 RURAL = 4065	YES	0.00	0.964	4.37	4269	0.000	290	66	160	420
					4.73	3716	0.000	290	61	169	410
Exotic/hybrid Chicken - cocks / broilers	URBAN = 5990 RURAL = 5360	NO	18.48	0.000	9.12	5622	0.000	631	69	495	766
					9.44	4379	0.000	631	67	500	762
Local (indigenous) Chicken - hens	URBAN = 2790 RURAL = 2280	NO	177.75	0.000	27.90	12154	0.000	510	18	474	546
					26.09	7979	0.000	510	20	472	548
Local (indigenous) Chicken - cock	URBAN = 3352 RURAL = 2899	NO	3.63	0.057	10.57	11867	0.000	453	43	369	537
					11.96	11285	0.000	453	38	379	527
Turkey	URBAN = 17008 RURAL = 11766	NO	164.18	0.000	19.45	3982	0.000	5241	270	4713	5770
					19.75	3903	0.000	5241	265	4721	5762
Ducks	URBAN = 4738 RURAL = 3554	NO	219.02	0.000	16.74	4972	0.000	1185	71	1046	1323
					13.96	2084	0.000	1185	85	1018	1351
Geese	URBAN = 9484 RURAL = 7338	NO	5.48	0.020	4.45	482	0.000	2146	482	1198	3093
					4.25	341	0.000	2146	505	1152	3140
Guineafowls	URBAN = 3173 RURAL = 2792	NO	17.03	0.000	10.63	3848	0.000	381	36	311	452
					9.61	1161	0.000	381	40	303	459
Other poultry	URBAN = 2380 RURAL = 1098	NO	31.35	0.000	4.25	205	0.000	1282	302	687	1877
					4.23	122	0.000	1282	303	682	1882
Horses	URBAN = 276689 RURAL = 280647	YES	0.85	0.359	-0.30	212	0.761	-3958	12998	-29580	21664
					-0.30	197	0.763	-3958	13120	-29831	21915
Mules/Donkeys	URBAN = 98390 RURAL = 101368	YES	2.27	0.133	-0.50	627	0.619	-2978	5992	-14744	8788
					-0.54	230	0.589	-2978	5507	-13829	7872
Dog	URBAN = 14945 RURAL = 20037	NO	8.26	0.007	-2.46	39	0.018	-5092	2068	-9276	-908
					-2.59	38	0.014	-5092	1967	-9075	-1109
Rabbit	URBAN = 8922 RURAL = 2791	YES	7.00	0.013	2.83	32	0.008	6131	2166	1718	10543
					3.17	20	0.005	6131	1936	2089	10172
Other	URBAN = 85000 RURAL = 300	NO	9.55	0.054	1.14	3	0.337	84700	74256	-151614	321014
					1.47	2	0.279	84700	57518	-162780	332180