Econometric and Time Series Model Selection: A Choice between Two Possible Approaches to Assess Linkages between the U.S. and Chicken Export Markets

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Introduction

The U.S. chicken market experienced a tremendous pressure in 2002 because of chicken meat oversupply in domestic market and increase in excess supply in the world market. However, little attention has been given to study the situation. Perhaps, analyzing different markets for various chicken cuts is useful to understand the reasons behind the unfavorable situation. The industry blamed two factors for the situation (1) due to Russia's imports embargo and (2) the avian influenza outbreaks (WATT Poultry USA's Rankings). The above facts showed that the industry has failed to recognize the impact of a strong demand for chicken white meat on export markets. Poultry economists also failed to recognize that a strong demand in the white meat market in one hand is favorable, but it also creates negative impacts on the industry, especially in the long run.

Part of the reasons that the industry experiences difficult time to explain the situation is because of its effort to meet domestic consumers' demand for white meat. If a strong demand in the white meat market is not followed by the same growth rate in dark meat consumption in domestic markets, this development could create serious problems in the industry. An easy and short term business and marketing strategy to "dump" the dark meat to the international market while fulfilling domestic consumption for white meat is not what the industry wants to pursue as a long run strategy.

Price relationship studies in different related markets have drawn considerable attention and have been an important area of research in recent years (H.L. Goodwin, McKenzie and Djunaidi; Babula, Bessler and Payne). Babula, Bessler and Payne's study in the wheat-related market found a bi-directional price movement in the wheat and downstream wheat-based markets.

Goodwin, McKenzie and Djunaidi recent study in broiler related markets found that there are strong relationships between different US wholesale broiler prices. They found that the BSB is the most important chicken part and it is the driving factor behind price discovery in the US chicken market. This paper extends the previous study by examining possible effects of a stronger demand of chicken white meat in the U.S. on international prices. This study hypothesizes that a strong demand in US domestic market will cause a negative impact on the world chicken price. This happens because of increasing excess supply of other chicken parts in both domestic and in the global markets. Study of price linkages between the domestic and export chicken prices is therefore important because the inter-relationships nature of the broiler business operation.

If the international market is seen as a place where the integrator can dump all the dark meat, then one might expect that the cost of production will heavily be placed on white meat products when they are priced. So, US consumers will always pay a higher price for the BSB. In contrast, overseas consumers will pay a lower price for the chicken (dark) meat that they consumed. In other words, domestic or US consumers have had subsidized overseas buyers in the past.

The objective of this study is to examine how marketing strategies applied in domestic markets could affect global chicken markets. The second objective is to study and compare the estimation results generated from econometric and time series approach in studying price linkages in two different markets (white and dark meat) and in two different locations (domestic and export markets). Could the results provide the same useful information and potentially answer the 2002 US chicken meat over supply? Third,

the results of this study will show players in the industry that ignoring what happens in derived dark meat market and only pay attention on the domestic white meat market potentially will create serious shortfalls in the long run. Long run corrective production, marketing and price strategies will also be identified in this paper. It is also the objective of this study to determine dynamic price relationships observed in traditional auction-type wholesale broiler markets in the presence of extensive industry contracting both in the domestic and export markets. Thus, add understanding about the industry.

Price discovery in the broiler market may be more complex than in the beef and pork industries because price linkages in different wholesale broiler markets are directly affected by the dominant presence of production and marketing contracts between integrators both in the US and buyers in both domestic and overseas markets. Therefore, one might expect to find the price discovery process is influenced by the way the industry conducts business. The contracting strategies applied in both export or overseas output markets need to be taken into account through price linkages in different markets to capture the latest developments occurred in the industry. Currently, most food processors use contracts for buying inputs and selling their products in the output market. This is particularly true in the broiler market. Most broiler integrators sell wholesale broilers without giblets (WOG) and different broiler cuts or parts (e.g., boneless skinless breast (BSB), wings, leg-quarters, backs and necks through contracts with buyers such as fast food or grocery chains which operate domestically or overseas through franchising.

The WOG price may be thought of as the carcass price and integrators commonly use WOG price as a market signal for product costing of different broiler cuts both for domestic and overseas markets. The WOG price provides important information for

integrators in making business decisions such as input buying decisions and the level of price offered in sale contracts with other food processors. The WOG price is determined by market demand and supply conditions in its own market, in the world market and in other domestic chicken markets. A broiler is cut into different pieces by the integrators for further processed by other industries or to meet consumer demand for fresh chicken. In this sense the demand for WOGs comprises both derived demand for broiler cuts and primary demand for the WOG itself. Thus fluctuations in demand for different broiler cuts help determine movements in WOG price. For example, increasing demand in one particular broiler cut market, such as BSB, will result in an automatic increase in supply of other broiler parts in the US and excess supply in the global markets regardless of whether or not the market demand for these parts increases. Therefore, there exists a simultaneous force in the whole broiler market that determines price movements in each domestic wholesale chicken market as well as in overseas markets.

Data

Monthly data for the econometric model are from ERS and FAS. Price data for WOG, BSB, Wings, Leg quarters and Backs and Necks are obtained from USDA's Poultry Yearbook for the period January 1990 to December 2002. The summary statistics for each price series measured in cents per pound are shown in Table 1. Each of the price series (with the exception of Backs and Necks) exhibits fairly large fluctuations over the sample period. In particular BSB, the most valuable broiler cut in dollar terms, was also the most volatile of the price series over the sample period as measured by its variance, 649.23. All prices were transformed into natural logarithms prior to estimation. Augmented Dickey Fuller (ADF) unit root tests were employed to test if each of the price

series were stationary. The evidence, on balance, suggested that the five price series were stationary in logged levels after adjusting for seasonality. Hence, the specification of a VAR model, rather than a Vector Error Correction model (VEC) was deemed appropriate.

Structural Econometric Model

Simultaneous equation system and time series VAR model potentially can be applied to study price dynamics in different related markets. Hamilton suggests that estimating the VAR system is equivalent with estimating the reduced form of simultaneous equation or the structural model. Though, he reminds researchers that applying a structural equation model could suffer from the inability to correctly model the dynamic relationships within and among different variables in the system. He further noted that the structural approach to study dynamic relationships among different variables of interests in structural equation sense places too many restrictions.

In this study, the structural equation is written in two equations-demand and supply. Per capita chicken consumption (all type of chicken meat) is treated as dependent variable. There are three explanatory variables used in estimating demand equation and these variables are chicken retail price, beef retail price and per capita income. All variables are transformed in logged form and they are all in real term prior to any estimation. Retail and export prices are considered as endogenous in the system.

The supply equation is modeled as quantity of chicken production in retail basis as the dependent variable. There are four variables on the right hand side and these variables are farm price, lag three-month of production, lag two-month export price (in real term) and a beginning inventory variable. An inverse relationship between chicken

production and export price is expected due to a large country effect. To show how fast export price adjusts to a shock on the level of production, lag more than one-month export price is included as explanatory variables in the supply equation. By doing so, one might know the dynamic effects of US chicken production on export price beyond one month horizon. The estimated dynamic multipliers enable one to construct an impulse function as suggested by Greene (1997) who argued that graphing the multipliers against the number of lags is equivalent to draw the impulse response function. One will expect that as time lapses the effect of the shock will tail off until it reaches a pre-shock price level.

Time Series Approach

The VAR approach applied to analyze price dynamics in related markets has been discussed in many studies in the past. Therefore, the theory of VAR will not be discussed in detail. In this analysis, the VAR model is utilized to determine dynamic price relationships among different wholesale broiler cuts, WOG and export price. Specifically, the magnitudes and directions of price shocks in a particular market and its effect on other markets are analyzed. Different broiler cuts are treated as distinct products and each is therefore assumed to have its own market; however, all markets are related. These broiler cut prices were modeled as a vector autoregressive (VAR) model[2]. VAR models consist of a set of distributed lag equations to capture the relationships

[2] ADF unit root test results showed that WOG, Leg quarters and Wings are stationary in the logged levels. Goodwin, McKenzie and Djunaidi also applied a VAR model to study price dynamics in the industry. In addition, Babula, Bessler and Payne utilized a VAR model to study price dynamics in U.S. wheat-related markets. Though not all variables in their analysis are I(0), they also applied a VAR approach to analyze U.S. wheat-related markets. Therefore, in this paper a VAR is chosen rather than a VEC model.

among variables in the system. Sims argued that such a model reduces spurious *a priori* restrictions on the dynamic relationships.

In this analysis, the VAR system is triangularized in order from highest to lowest as follows: BSB, WOG, Wings, Leg quarters, Backs and Necks and export price. Ordering was based upon economic theory and prior industry knowledge. First, with respect to economic theory, price endogeneity and information flow within the wholesale broiler complex may be explained by both WOG supply and the relative demand for WOG and broiler cuts. Supply induced price movements primarily result from WOG production shocks. On the other hand, demand shocks generated in broiler cut markets could theoretically lead to derived demand induced price responses in the WOG market. In addition, demand shocks in both broiler cut markets and the WOG market could potentially cause price substitution effects that would be transmitted across wholesale markets. Bearing this in mind, the relative importance of WOG price in transmitting supply induced price effects to other markets is recognized by placing it second within the variable ordering.

Second, prior industry knowledge directed the order of broiler cut prices. Placement of BSB as first in the variable ordering reflects the fact that white meat is the most valuable part in dollar terms of a broiler in the US and that the decision of how much WOG and dark meat to produce depends heavily on the market demand for the white meat. Ordering of Wings, Leg quarters and Backs and Necks prices also reflect their respective dollar value contributions of the total value of a broiler. Backs and Necks in particular may be regarded as a by-product and is deemed unlikely to induce significant price movements in other wholesale broiler markets. The export price is

placed at the end of the price ordering. This selection reflects that export market is not a main target market for US chicken business. Preliminary testing using alternative variable orderings and based upon the magnitude of their respective FEVD's indicated that the chosen ordering was reasonable.

Econometric Estimation Results

The Econometric model is estimated using a three stage simultaneous equation system. This method is chosen because the error terms are correlated among equations. The results of econometric estimation are presented in Table 2. The sign of the estimated variable in demand equation is consistent with the economic theory and they are all significant at a one percent level, except for the income variable which is significant at a five percent level. The sign of the estimate on income shows that chicken is still a normal good for U.S. consumers[3].

All explanatory variables in the supply equation are statistically significant at either one or five percent level except for farm price, lag one period of production variable, lagged one month export price and beginning inventory. Lag two and three-month period of production are statistically significant at one percent and it shows a positive relationship with current production variable. This might suggest that integrator did capitalize the information that they received in the past two or three months and accommodate that information in planning their future production. The positive sign could also be interpreted as a positive trend of US broiler production. As white meat production keep increasing from month to month, this development automatically will

[3]While the sign of estimates are consistent with both economic theory and past empirical studies; the magnitude of own price, cross price and income elasticity of demand seem to be a bit higher compared to other previous studies. This could happen as a result of estimating per capita chicken consumption in retail basis.

increase supply of other broiler cuts in the domestic market which will increase excess supply in the global market as well. This situation might partly explain why dark meat excess supply in both domestic and world market tends to increase dramatically in recent years. Perhaps, this was the answer to 2002 US chicken gluts.

The supply estimation results showed that broiler production response negatively to current export price, but it responses positively to lag one month of the price, though the estimate is not significant. The negative sign showed a large country effect and could be interpreted as the ability of the overseas buyers to react correctly on expected US production. Since most chicken exports are sold under trade contracts, this information should already been absorbed in the production planning. Therefore, it should only have a minor impact on the export price. Apparently, this is not the case. One possible explanation of the situation is that the producers might have considered the export market as a secondary market because the sales in this market make less contribution to company's profit. As a result, regardless of what happens in the export market, it will not affect the firm's marketing and pricing strategies. It means integrators will keep slaughtering the birds because demand for its highest value chicken part--which is BSB is still going strong in the domestic market. The producer cares less about other markets outside the BSB because its production cost has been covered from selling the white meat. As long as the producers can sell its BSB products, they are still in good shape. This finding confirms two things: (1). the export markets mainly consist of a dark meat and (2) the export markets are not the primary target markets as seen by the producers. This finding also suggests that if the company is able to meet white meat demand in domestic market then broiler production will keep increasing regardless the level of the

export price[4]. This result is also shown by a small estimate of inventory variable in the supply equation. Though the estimate of inventory is not statistically significant, but one could infer that the producers are less care on how much dark meat is available in their storage when making production planning. Apparently, the beginning inventory is not a choice variable when integrators put together company's operating budgets.

Time Series Estimation Results

The time series analysis is estimated by diagnosing and testing optimum number of lags. Test on the lag lengths from one to fourteen months indicated that a nine-month lag specification is necessary to adequately model the system. Prior to imposing a recursive system on the VAR, the contemporaneous correlations of the equation residuals are examined (Table 3). This procedure allows for any simultaneous interaction and contemporaneous price linkages among prices to be considered. All of the correlation coefficients between broiler cut price and WOG price residuals are significantly different from zero at the one percent level. This indicates that a significant portion of information is reflected in price adjustments between WOG and white and dark meat prices within the current month. On the other hand, none of the parts has a strong contemporaneous correlation with export price. A strong contemporaneous correlation could mean that the markets respond rapidly and efficiently (within the sample interval) to new information. The residual correlation coefficients are of approximately the same magnitude between WOG and BSB prices, WOG and Wings and WOG and Leg quarters prices. This suggests that WOG price movements in the current period are closely linked to both BSB (white meat) prices on the one hand and Wings and Leg quarters (dark meat) prices on

[4] Perhaps, a price sensitivity study is relevant to address the issue. This is a subject of future research.

the other hand. One possible explanation for the strong relationship between current period WOG price movements and other broiler part price movements could be that production shocks emanating in WOG market are simultaneously, and at least partially, transmitted across other broiler part as well as to the export prices. The analysis above showed that export price does not have a strong correlation to other parts, except to its own price and fairly by leg quarters. This finding partly explains why export price reacts so slowly to dark meat price shock in the US markets. The slow adjustment is also shown by impulse response function which will be discussed in detail below.

Further examination of FEVD shows other evidence of price linkages in the markets and enables one to determine which of these markets are exogenous or endogenous relative to one another at different forecast horizons. Forecast error variance decomposition and standard errors for in-sample forecasts for periods one, six, twelve, eighteen, twenty four, thirty and thirty six months ahead are reported in Table 4. The longer lag periods (twelve months or more) roughly correspond to lengths of time necessary to alter numbers of parent, grandparent and pedigree flocks that produce broiler chicks for feeding and slaughter. In all cases, as the forecast horizon increases the standard errors grow, as would be expected, but tend to level off – providing additional evidence that the system is stationary. The proportion of the forecast error explained by innovations in all of the system variables is documented with respect to BSB, WOG, Wings, Leg quarters, Backs and Necks and export prices.

Export price is affected by its own lagged price and marginally by the dark meat (leg-quarters) prices. Export price is relatively exogenous after a one month forecast horizon, accounting about 91 percent of own-variation. Thereafter, leg quarters price

explain about 25% to 30% explanatory power of export price FEV, and within thirty six months leg quarters price accounts for as much as twenty five percent of export price FEV. Other boiler cuts such as wings, Backs and Necks and BSB explain on-average about 6, 7 and 8 percent of export price FEV, respectively. WOG price also explains about six percent of export price FEV. This suggests that an increase in U.S. broiler production does have impacts on chicken export price. This finding is consistent with the econometric results and a large country effect hypothesis.

A strong relationship between BSB and WOG prices is evident, with innovations in both price series explaining relatively large proportions of the other price's FEV. In particular, BSB price has a major influence on WOG price FEV (e.g., BSB accounts for 30% of WOG FEV from month twelve onwards). In contrast, other cuts contribute about 16 percent to WOG price's explanation.

BSB price is relatively exogenous over a year forecast horizon, accounting for approximately 40% of own-variation. Thereafter, other broiler cut prices contribute little explanatory power of BSB FEV and within three years WOG price accounts for as much as 30% of BSB FEV.

Table 4 results also indicate that Wings price is fairly endogenous over forecast horizons. WOG prices account for sixteen percent while BSB prices only account for approximately 10% of Wings FEV over all forecast horizons. Apparently, Leg quarters has marginal explanation of Wings FEV, especially after twenty-four-month forecast horizon. Clearly this influence appears to be unidirectional (Wings has no influence on Leg quarters). This result is probably related to slow price adjustments in Wings price in response to export market shocks primarily effecting Leg quarter prices. A substantial

amount of US dark meat production is exported and Leg quarters comprise a major proportion of dark meat exports. This result confirmed recent price dynamics study in broiler-related markets (H.L. Goodwin, McKenzie and Djunaidi).

Leg quarters appear to be exogenous within the broiler market complex with approximately 50% or more of its price variability attributed to own-variation. This is again consistent with the fact that a large proportion of Leg quarters are marketed for export and hence domestic market broiler prices would have less influence on its price.

Backs and Necks price is relatively exogenous beyond the first month. Export price accounts for 8% to 9% of Backs and Necks FEV over most forecast horizons, while Leg quarters have some influence on Backs and Necks FEV after 24 months. These results would be consistent with both supply induced price movements reflected in export market effects reflected in Leg quarters price. The by-product status of Backs and Necks would also account for the lack of any discernable relationship with either the white meat BSB or the quasi-white meat Wings.

In general, Table 4 results highlight the role played by leg quarters price in explaining variations in export price and the BSB price in driving WOG price movements. In contrast the price of other cuts appears to have about 15 percent effect on WOG prices. These results are consistent with the fact that chicken dark meat plays a less important role in price determination, since these parts are considered to have less value by most integrators in the industry. The evidence showed that WOG price found to have some influence in both domestic chicken parts as well as in export markets.

Impulse responses generated by one standard deviation shocks in each of the wholesale price series permit evaluations of the dynamic adjustment paths of the prices.

Impulses for export prices are presented in Figure 1. The statistical significance of each impulse response is illustrated by graphing 95% confidence intervals around the point estimates for the impulse responses.

Figure 1 includes a panel of six impulses generated by a price shock to export price. It is obvious that only shocks in dark meat affect the export price. This finding confirms the econometric results in that US chicken export comprises mainly dark meat. Initial shock in both Wings and Leg quarters will cause export price to fluctuate. An initial shock to leg quarters represents approximately 0.5 percent increase in the export price and it takes approximately twenty months for the export market returns to pre-shock levels. Examining Figure1, one also will find that the impulse response function generated by a shock in Wings price will generate a similar pattern to the export prices. A shock in Wings price will also takes approximately twenty month before the export price reaches the pre-shock level. This finding shows on how slow the export price adjusts to a shock in the dark meat market. A price shock in other broiler part markets seems not to have significant impact on the export price. This evidence confirms that export market is not a main target market considered by most integrators. Therefore, the industry reacts slowly on what has happened, what is happening and what will happen in the export markets.

Examining the other impulse response function, one notices that export price reacts instantly to its past price change. Thus one might conclude that export price is fairly endogenous in the system. This information is pretty useful in modeling the study using structural econometric model. As most people might think that export price could be modeled as endogenous variable as guided by the economic theory (large country

effect), but the time series results showed this is not the case. This finding certainly adds one's understanding on price dynamics in broiler industry in a manner that consistent with empirical evidence and real-world problem.

Significant conclusions that can be drawn from the impulse response analyses are as follows. First, export price react instantly to the change in its own price. Second, the change dark meat price, in particular leg quarters, will have effects on export price change. However, the rate of adjustments is very small and slow which suggests that export market mainly consist of dark meat products that integrators care less. Third, impulse responses generated in export market is relatively long in duration (consistent with FEVD results) and highlight the importance of marketing contracts in the broiler industry. Fourth, there is ample evidence to suggest that dark meat is mainly shipped to overseas markets by U.S. boiler integrators and this market is not the major target considered by most of them. Fifth, one might expect that the world export price will tend to keep decreasing over time (in the future) so long consumers in the US chicken market prefer the white meat over the dark meat.

Concluding Comments

Econometric analysis showed a negative relationship between export price and US broiler production which confirmed a large country effect. Time series results showed some evidence of price relationships between dark meat, particularly leg quarters and export price. Other broiler cuts do not have significant explanation on export price variability. In terms of price discovery, shocks in the BSB market have a greater impact on WOG market prices compared to price shocks emanating in dark meat markets. This

suggests that the BSB (white meat) market plays a more important role in transmitting pricing signals to WOG and other broiler cut markets than do the dark meat markets.

Though estimated in aggregate levels, the econometric results showed consistent findings with those of current and past time series studies in that white meat is the most important driving factor in the chicken business such that integrators are willing to make a trade-off between high white meat price sold in domestic markets and low dark meat export price. It can be seen that both econometric and time series analysis produced consistent results. Therefore, add overall understanding about the industry.

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Table 1 – Basic Statistics of WOG and Different Chicken Wholesale Price and Export Price (cents per pound), USDA Monthly 12 Cities and FAS Nominal Price 1990-2002

Variables	Mean	Variance	Minimum	Maximum
WOG	56.72	20.98	48.02	72.13
BSB	179.19	649.23	117.90	225.51
Leg Quarters	29.36	53.73	15.65	60.02
Wings	63.15	150.80	40.07	95.42
Backs and Necks	11.48	1.08	9.40	13.35
Export Price	44.73	52.42	29.61	57.57

Table 2 – Econometric Estimation Results[5]

Demand Equation **Dependent Variable: Consumption**		
	Variable Estimates	t-statistics
Constant	3.01	0.80
Chicken Retail Price	-2.54	-4.05**[6]
Beef Retail Price	1.09	3.59**
Income	0.46	2.19*
Supply Equation **Dependent Variable: Broiler Production**		
Constant	2.76	2.47*
Farm Price$_{(t)}$	0.01	0.14
Production$_{(t-1)}$	-0.0003	-0.01
Production$_{(t-2)}$	0.35	6.79**
Production$_{(t-3)}$	0.48	8.95**
Export Price$_{(t)}$	-0.15	-2.30*
Export Price$_{(t-1)}$	0.05	0.76
Beginning Inventory	0.000008	1.39
System Weighted R^2	0.91	

[5] 3SLS estimator is utilized. Chicken retail price is the only endogenous variable included in the system. Given its endogeneity, WOG along with other stationary chicken cuts prices could potentially be included in the supply equation as well.

[6] * and ** denote significant at 5 and 1 percent.

Table 3 – Contemporaneous Correlation Coefficients of VAR System Residuals, 1990-2002

	WOG	Leg-quarters	Wings	Backs & Necks	Backs & Necks	Export Price
WOG	1					
Leg-quarters	0.41	1				
	(0.00)					
Wings	0.41	0.08	1			
	(0.00)	(0.15)				
Backs & Necks	0.22	0.09	-0.01	1		
	(0.00)	(0.15)	(-0.52)			
BSB	0.46	0.01	0.36	0.13	1	
	(0.00)	(0.46)	(0.00)	(0.05)		
Export Prices	0.002	0.04	-0.07	-0.13	0.02	1
	(0.00)	(0.31)	(-0.81)	(-0.94)	(0.41)	

Table 4 – In Sample Forecast Error Variance Decomposition Attributed to Innovations in Respective Series, January 1990 through December 2002

	Month Ahead	Standard Error	WOG	Leg-quarters	Wings	Backs & Necks	BSB	Exports
WOG	1	1.49	98.50	0.18	0.00	0.49	0.78	0.03
	6	2.31	64.69	3.52	1.19	21.23	7.68	1.70
	12	2.52	59.59	4.97	2.01	22.07	9.40	1.96
	18	2.64	55.62	6.47	5.55	20.36	10.13	1.89
	24	2.68	54.04	7.22	5.53	20.10	11.10	2.02
	30	2.72	52.93	7.66	5.73	19.72	11.86	2.10
	36	2.77	51.77	7.38	5.75	21.09	11.89	2.11
Leg-quarters	1	4.59	18.96	71.80	1.49	1.61	6.00	0.13
	6	6.30	19.06	64.32	2.71	2.11	8.45	3.35
	12	7.37	16.20	58.18	3.90	6.20	7.87	7.66
	18	8.34	16.94	49.65	9.43	8.91	6.39	8.68
	24	8.82	15.62	44.51	12.79	12.06	6.46	8.56
	30	9.16	15.02	42.08	14.46	13.66	6.78	7.99
	36	9.56	17.20	40.39	13.40	14.33	6.65	8.02
Wings	1	4.30	19.22	1.39	78.43	0.09	0.23	0.64
	6	5.92	16.43	2.14	68.42	0.35	9.75	2.91
	12	6.73	15.58	3.69	60.76	1.23	9.23	9.51
	18	7.36	15.59	4.13	56.55	3.58	10.57	9.57
	24	7.77	15.97	3.81	57.37	3.60	10.63	8.62
	30	7.94	16.11	3.96	56.65	3.56	11.35	8.38
	36	8.07	16.51	4.54	55.20	3.50	11.85	8.40
Backs and Necks	1	1.04	11.82	1.57	1.01	82.97	2.61	0.02
	6	1.55	11.78	11.00	5.44	58.93	9.04	3.81
	12	2.07	16.38	14.23	3.96	57.29	5.32	2.81
	18	2.23	15.49	18.65	3.47	53.11	5.40	3.87
	24	2.36	16.78	20.52	3.12	47.95	5.85	5.79
	30	2.47	16.51	20.92	3.01	47.10	5.70	6.76
	36	2.52	15.94	20.33	4.32	46.97	5.54	6.89
BSB	1	2.35	28.51	2.84	1.94	0.13	66.55	0.04
	6	3.28	27.80	2.66	3.26	17.55	43.58	5.16
	12	3.80	32.62	2.59	5.40	13.97	39.35	6.08
	18	4.03	30.57	3.31	5.67	13.42	39.57	7.46
	24	4.18	29.99	4.50	6.64	12.65	38.94	7.29
	30	4.30	30.07	5.44	6.42	12.12	38.79	7.17
	36	4.41	29.19	5.52	6.58	12.9	38.42	7.45
Export	1	1.72	0.01	5.79	1.21	1.85	0.26	90.87
	6	2.37	6.10	25.15	4.09	6.11	7.51	51.06
	12	2.67	6.11	30.02	4.46	8.27	8.50	42.64
	18	2.98	8.52	29.06	7.83	8.70	8.72	37.18
	24	3.10	8.74	27.37	8.84	9.78	9.20	36.07
	30	3.18	8.39	26.25	9.47	10.83	9.95	35.12
	36	3.26	9.38	25.91	9.29	12.40	9.56	33.45

Effects of a Shock to LEXPORT