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Abstract

Aggregation across time has long been recognized as a potential source of specification error within time series modeling. This source of specification error has major implications for the use of causality tests in spatial equilibrium analyses. This study reviews the theoretical econometric literature to generate hypotheses which are empirically tested to illustrate the impacts of aggregation on causality tests. Granger causality tests for three major corn markets reveal one-way causality to be "fragile" with respect to changes in the level of time aggregation in data. Dynamic multipliers are discussed as being one method of checking the specification of the model.

Keywords: causality tests, corn prices, dynamic multipliers, time series, aggregation across time, specification error, price discovery

The Problem of Aggregation In ~~Spatial~~ Equilibrium Analysis

A growing literature has focused on testing for Granger causality between markets. Frequently this econometric technique is used to examine pricing efficiency and relationships between markets (Lee and Cramer; Adamowicz, Baah and Hawkins; Sims (1972); Spriggs, Kaylen and Bessler). Causality tests have also been used to define geographic markets (Uri and Rifken). The attractiveness of this technique can be attributed partly to the supposition that price data will reveal the causal relationships between markets and commodities.

However, the validity of the econometric techniques used in testing Granger causality has been questioned recently. The arguments against the technique have ranged from the general point that correlation does not imply causality, to specific econometric criticisms of the Granger causality model. Zellner has stated that the mechanical application of causality tests is the measurement of economic relationships without theory. Ziemer and Collins applied Granger causality tests to agricultural price series and irrelevant data series and found that Granger causality can be ambiguous in the identification of behavioral relationships. Jacobs, Leamer, and Ward asserted that the null hypothesis tested in Granger causality is necessary but not sufficient to imply causality and that causality tests are rendered uninterpretable by any specification error. Conway, et al. went so far as to argue that the econometric specification is fatally flawed. Also, Bessler and Kling analyzed the dependence of causality test results upon the autoregressive properties of data. Repeatedly, specification error has been suggested as a major problem when Granger causality tests are applied to economic time series.

Aggregation across time can also be a major source of specification error in economic time series analysis because it involves missing information. Although aggregation of economic time series has been analyzed for its

implications to economic modeling since the 1950's, the empirical literature on Granger causality has largely ignored the implication of this previous research (Nerlove, Hannan).

The central purpose of this paper, therefore, is to examine the effects of aggregation across time on spatial equilibrium analysis, when Granger causality tests are used. First, the basic prcodure frequently used to test Granger causality is presented. The econometric literature on aggregation is reviewed for implications of using this procedure for causality testing. Previous research by agricultural economists is reviewed to gain a perspective on the levels of time aggregation being used in spatial equilibrium analysis. Second, three major commodity market price series are analyzed to demonstrate how aggregation across time can affect Granger causality tests. Finally, implications of the results for spatial equilibrium analysis are discussed.

Granger Causality

Testing for Granger-type causality between specified markets is frequently done using test refined by Geweke. These tests are based on one- and two-sided distributed lag regressions for each bivariate relationship specified. This approach is not a test of exogenity but rather of "informativeness"[1] (Jacobs, Leamer, and Ward). This is the procedure described below in an empirical example. Although several other techniques are found in the literature, this form of the test is used here because it is the most common form applied.

To test the null hypothesis that X does not predict Y, ordinary least squares (OLS) is used in this procedure. The test for one-way causality is based upon the following specification:

$$(1)\quad Y_t = a_1 + \sum_{j=1}^{p} a_{1j} Y_{t-j} + e_{1t}$$

$$(2)\quad Y_t = a_2 + \sum_{j=1}^{p} a_{2j} Y_{t-j} + \sum_{k=1}^{q} b_{2k} X_{t-k} + e_{2t}$$

where p and q are the number of lags. The residuals (e_{it}) are independent,

serially uncorrelated random variables with zero means and finite variances for all time periods (Ziemer and Collins). The sum of squared errors (SSE) are used to calculate the F-test, which tests the informativeness of X on Y. A similar test is used to evaluate the informativeness of Y on X.

A test of no instantaneous causality is used also, which is based on the residuals from equation 2 and those from

$$(3) \quad Y_t = a_3 + \sum_{j=1}^{p} a_{3j} Y_{t-j} + \sum_{k=0}^{q} b_{3k} X_{t-k} + e_{3t}$$

The appropriate number of lags (p and q) used are specified by Akaike's final prediction error (FPE), as described by Bessler and Brandt. Following the precedent of previous studies, p and q are set equal to each other here (Bessler and Brandt).

If the original price series is found not to be stationary, a first difference filter is frequently applied to remove the linear trend (Granger and Newbold). However, in studies by Sims (1980) and by Litterman it was argued that stationarity may be unnecessary. Therefore, this study follows Granger's principle that series need only to be consistent (all either stationary or nonstationary).

Aggregation Across Time

Intuitively, it is clear that data aggregation can be a problem in market and price analysis. In a market where price adjustment occurs quite quickly (zero to two days), utilization of weekly price data might disguise the true nature of temporal relationships.

Problems of aggregation across time arise largely from missing data. In analyzing price series with distributed-lag models or autoregressive models, the missing data problem can evidence itself as either a skipped sampling or time aggregates (Maddala). An example of skipped sampling would be a

situation where prices are available for only one day during the week and not for the remaining days of the week. An example of time aggregation would include using average prices for a specific time period, such as a week or month; only the average price is available and it is not possible to reconstruct daily prices.

Both these types of aggregation across time have appeared often in research efforts (Moriguchi). For example, Granger causality tests have been applied extensively to grain markets. Brorsen, et al. in their analysis of spatial and temporal relationships among U.S. grain markets used only Thursday prices. In an analysis of world wheat markets Lee and Cramer used weekly and monthly prices.

Causality tests attempt to measure the informativeness of one market upon another in terms of prices. Informativeness refers to the consistent estimation of model parameters. This points to a major problem of Granger causality: predictions may not describe the actual distributed lag relationship between markets. The effects of aggregation may explain why some studies, such as that by MacArthur, et al., have produced statistical results which directly contradict economic theory. Although econometric research has not specifically analyzed the implications of aggregation for testing of causality theory, the aggregation literature has addressed the implications for distributed lag models and the dynamic characteristics of models estimated.

Tiao and Wei analyzed the affect of aggregation across time between two discrete time series variables. Using the illustration of a linear dynamic difference equation model, they found that aggregation contributed to the loss of information concerning the autoregressive process. They judged the information loss to be large relative to the loss of the model's predictive

efficiency.[2] In addition, time aggregation transformed the relationship into a feedback system. Since one-way Granger causality is based on the identification of feedback between markets, this particular theoretical result may cause one to question the validity of using highly aggregated data in causality tests. Tiao and Wei recommended that in the estimation of any basic dynamic model, it is highly desirable to obtain data as disaggregated as possible.

Wei extended previous research dealing with a basic infinite distributed lag model to the case of a general finite distributed lag model. Again the loss in efficiency due to aggregation was found to be substantial with increasing levels of aggregation. The analysis found the loss to be more severe when the input variable is negatively correlated. Tesler had found this to be true also in his analysis of equi-spaced samples of moving sums for non-overlapping discrete intervals. These results call into question the application of first differences to whiten aggregated data series for use in causality tests.

Zellner and Montmarquette summarized the problems of aggregation to include distortion of parameter estimation, lower power of tests, inability to make short-run forecasts, and inability to discover new hypotheses about the short run behavior of data. These are all severe criticisms of the use of time aggregated data in causality analysis. Therefore, the question confronting analysts is what to do about aggregation across time in reference to causality tests.

Leamer, in an unsettling article about the "con" in econometrics, suggested the addition of two words to econometric discourse. The two words are "whimsy" and "fragile".[3] In causality tests a large number of (whimsical) distributional assumptions must be made in order to estimate the models. As has been mentioned, aggregation over time can cause considerable disruption of

these "assumptions." So there is a need to examine whether the inferences associated are insensitive to the choice of assumptions when dealing with empirical data.

The concept of "fragile" refers to whether conclusions drawn from a model hold up if the model is changed. If conclusions are sensitive to prior assumptions or model specification, a serious question of credibility concerning the model exists. Leamer's approach to judging validity is used in the analysis which follows.

An Empirical Example

To demonstrate the importance of aggregation across time to spatial equilibrium analysis, when using Granger causality tests, an empirical example is presented. The proposed methodology was applied to eight different types of aggregation using the same original price series. Given the broad range of time aggregates being used by agricultural economists, there is a need to demonstrate why time aggregation is an issue.

The specified levels of time aggregation have appeared previously in the agricultural economics literature. Also, the results will demonstrate whether Granger causality test are "fragile" to changes in the "Whimsical" assumptions required for the analysis. The discussion above implies that the technique may be fragile. The empirical analysis also provides additional insights into previous results involving Granger causality tests in the commodity marketing sector.

Data Set

Daily price data for No. 2 yellow corn were collected from the Minneapolis, Chicago and St. Louis corn markets. The data source was Grain and Feed Market News of the Agricultural Marketing Service, USDA. The midpoint of the daily range was used in the analysis. The daily prices were collected for the four year period of October 1, 1980 through September 30, 1984.

The daily price data were used to develop seven additional data sets for various causality tests. The data sets were transformed using methods appearing in the literature. Five data sets consisted of daily prices for a specific day of the week. For example, the Monday price data set consisted of the daily corn prices that occurred on all Mondays during the specified time period. The sixth series, the weekly data set, was a simple average of the daily prices for the week. The seventh new series, the monthly data set, was a simple average of all daily prices for each month.

The markets were selected because of their close spatial linkage and because they represent major markets for the undifferentiated commodity analyzed. It is expected that any causality evidenced in the price series for such markets would more likely be based upon actual interaction than that found in more distant spatial markets.

FPE Results

Presented in Table 1 are the appropriate number of lags as specified by Akaike's final prediction error (FPE) technique. All the price series were first differenced to remove the determinate part of the analysis. When the specified autoregressive models were estimated, Q-statistics revealed that whitening was necessary for all the price series except the daily data. To correct for this problem, lag structures based on the second largest FPE (which was five days in the three markets) were used for the daily price series.[4]

As can be seen readily from the table, the appropriate lag structure was affected greatly by the level of time aggregation. Also, there was no consistency in results between markets. The Minneapolis results, for example, indicate that aggregating the data may have created a lag structure where none existed before. The daily data had a zero lag structure, but a <u>five month</u> lag

appeared using monthly average data. Also, using different days of the week generated lag structures ranging from three to seven weeks for the same Minneapolis data. Clearly, non-market explanations must be used for this phenomena.

Granger Causality Test Results

As shown in Table 2, the hypothesis of instantaneous Granger causality was accepted for all types of aggregates across time, although the one-way causality tests were found to be more fragile to the aggregation assumption of the analysis. Five of the six specified one-way causalities were found to be significant for the daily price data.[5] The one day of the week analysis found the one-way causality tests to be very sensitive to which day of the week was selected. No significant one-way causality was found between the Minneapolis and St. Louis markets. Also, Friday-only prices provided no evidence of one-way causality. The remaining days all had at least one significant one-way causal relationship.

These results should not be surprising. If a strong instantaneous price relationship exists between two markets, this implies that the vast majority of the price adjustment is accomplished in the same day. Therefore, price changes between weeks should strongly reflect the instantaneous nature of the price adjustment process.

Lead-lag relationships are often more dependent upon price movements between days than between weeks. A price change on Friday is probably more dependent upon the price change on Thursday of the same week than the price change on Friday of the previous week. Using only one day per week in a price analysis places a restriction on the distributed lag structure of zero coefficient for all the other days of the week.

Results for the simple weekly and monthly price averages also supported the conclusion concerning the existence of an instantaneous price adjustment

process (Table 2). No significant one-way causality was found to exist in those data sets. These results appear to support the theoretical expectation of information loss due to aggregation.

Economic Dynamics

Broresen, et al. have proposed that causality models could be used to study the dynamic properties of markets to better understand the transmission of information. Their analysis used long term and intermediate multipliers to estimate the dynamic properties of models. The multipliers are defined to measure the reduced form impact of an unspecified one-time exogenous shock occurring through the error term.

The current analysis also estimated long term and intermediate multipliers for the instantaneous models (Table 3) using the approach suggested by Pindyck and Rubinfeld. Unlike the previously cited analysis, the multipliers were estimated here by assuming a one cent change in the specified exogenous market. In a spatial equilibrium model based on one-price, the long-run multiplier is not expected to be significantly different from one. In this study the estimated long-run multipliers were generally close to one, however the size of the long-term multiplier appeared to increase with increasing levels of aggregation.

Length of Adjustment Period

The length of the adjustment period was also estimated (Table 4) to assess its sensitivity to aggregation. The speed of the adjustment process was specified by the number of time intervals required before the intermediate multiplier stabilized within 10 percent of the long-run multiplier.

The length of adjustment period was greatly affected by the level of time aggregation, as hypothesized according to the literature on dynamic

multipliers. The adjustment process was found to be extremely rapid using daily data. The period of adjustment was one day or less. These results support many empirical studies and indicate market efficiency. For example, Garcia found the majority of local Illinois grain elevators to adjust instantaneously to price changes in the futures market.

If the adjustment process for price changes does occur in less than a week, results for analyses using longer time aggregates should indicate instantaneous adjustment periods. If such results were obtained it would be reasonable to conclude that analysis of the dynamic adjustment process was not "fragile".

Using weekly data, the Minneapolis and St. Louis pairing had an adjustment period estimated to be instantaneous. The close proximity of these markets, plus both being on the Mississippi River system, probably contributed to this rapid adjustment. However, the monthly data for the pair of markets reflected a much different level of efficiency, with the system having a three month adjustment period.

The length of adjustment period varied for the other pairs of markets but ranged up to three months. Such adjustment periods would appear to be indicative of pricing inefficiency in the grain marketing system. But is it inefficiency or a reflection of time aggregation? Brorsen, et al. found extremely long adjustment periods in their analysis of spatial equilibriums of grain prices. These adjustment periods were calculated using a one-day per week price series. Such assertions of inefficiency in the grain market appear questionable when based on aggregated data. Identifying evidence of instantaneous causality may represent one way of determining whether much confidence should be placed in analyses of long adjustment periods. This would be consistent with the recommendations of Judge, et al. and Mundlak, that if the

actual adjustment process is much shorter than the aggregated data observation period, the model should not be specified as dynamic.

Implications and Issues Raised

Businesses involved in commodity marketing are specialists in the arbitrage of space and time utility. This implies that spatial equilibrium theory can provide insights into the expected characteristics of dynamic price relationships between markets. The arbitrage process places limits on dynamic characteristics of causality models and also provides guidance on the "appropriateness" of a hypothesis being tested.

Expectations concerning temporal dynamics of spatial equilibrium depend on distance as well. For example, analyzing two undiffer-entiated commodity markets 15 miles apart involves evaluating the ability of two organizations to arbitrage and compete in the same spatial market. If these organizations are using similar technologies, price changes in destination markets should cause identical and instantaneous adjustments in the two markets (Schmiesing, Blank, and Gunn). In direct contrast, two markets 5,000 miles apart could have completely different destination markets and, therefore, lack the interdependence of the previous case. Price changes in each distant market are the result of a distinct set of economic parameters. Statistical analysis of such distant market prices can measure their simple correlation, but models representing Granger causality may only be "whimsical".

The critical questions are: What are the "true" differences in various levels of aggregation across time, and what are their implications for the interpretation of causality tests? Analyzing daily price changes involves evaluating the actual ability to arbitrage between markets. Analyzing price changes over longer periods, such as a month, involves looking at the adjustment process in spatial equilibria between markets or evaluating specification

error. It is not surprising, for example, that Uri and Rifkin concluded that Los Angeles, Kansas City and New York were part of a single national flour market when they found instantaneous causality in their "adjusted" weekly data. Arbitrage between those distant markets requires less than one week.

Economists should attempt to identify the decision calculus of the economic agents being analyzed. This is particularly true in applications of Granger causality tests because the emphasis is on identification of information dissemination processes. Do commodity merchandisers base their arbitrage decisions on an average price for the week or the price during one day of the week? Probably neither, yet a number of papers based on these assumptions have been published.

For example, estimations of adjustment periods in the grain marketing complex based on causality models have been attempted recently (Brorsen, et al.; Beutler and Brorsen). Contradictory results in terms of adjustment periods were evident in the analyses. Adjustment periods were estimated to range from days to months between commodities and spatial markets. A possible source of this contradiction would be the level of aggregation over time. The research using daily data (Beutler and Brorsen) had a much more rapid adjustment period than the analysis (Brorsen, et al.) using Thursday prices only. As is the case with Granger causality tests, the estimation of adjustment periods will be subject to estimation problems implied by aggregation across time. A basic question is what do these adjustment periods actually measure? Is the analysis testing the efficiency of markets, measuring specification error, or measuring spatial adjustments between markets?

Alternative Approaches to Aggregation Problems

Zellner suggests assuming the appropriateness of a model and deriving implications of time aggregation for the specification of the model. Such an

approach would overcome part of Griliches' concern about both misspecification of models and testing of the implications of time aggregation for parameter estimation. However, Telser demonstrated that it is impossible to interpret missing observations in a continuum of values given an equi-spaced sample of observations. Therefore, Zellner's alternative may not always be feasible.

Mayer has indicated that a major issue confronting economics as a hard science is not the use of mathematics to formulate hypotheses, but rather to develop reliable methods of testing hypotheses. He was especially critical of the lack of adequate stress on data collection and analysis. In the review of causality literature summarized above, this problem does appear to be evident.

The problem partly relates to the inability to distinguish between valid and invalid information. Difficulties exist in the fact that aggregated data hide changes that are occurring in economic time series, as discussed earlier. However, Mayer did advocate that, instead of abandoning the efforts, economists should become more skeptical and place greater stress on the validity of results rather than on the technical sophistication of the techniques used. One difficulty faced in hypothesis testing, the inability to replicate experiments, may be resolved more easily in microeconomic problems dealing with a technique such as causality tests.

A price analyst has five basic options when attempting to deal with the problem of time aggregation. The first alternative is not to do the analysis, which is probably not very acceptable to anyone. A second option is to make a set of assumptions and present arguments which justify the use of aggregated data even though it does not appear to be appropriate. The third option is to confess the need for more adequate data series and then proceed with the analysis. A fourth option is to develop an alternative method of estimation to correct for the aggregation problem. A final approach is to develop a set

of prior expectations based on some theoretical context and see whether the estimated models meet those theoretical expectations. A review of the causality literature reveals a number of these approaches being used. This paper demonstrates the fifth approach to argue for its superiority.

Conclusion

Aggregation across time should not be ignored when evaluating the results of Granger causality. Previous theoretical analyses of the implications of aggregation for the estimation of autoregressive and distributed lag models clearly indicate that specification errors can develop. Data selected for analysis should be consistent with both the relationships specified by economic theory and the actual decision rules of the economic agents involved.[6]

Aggregation across time affects the estimated length of the adjustment period. Estimates of long adjustment periods may reflect specification error rather than inefficiencies in the marketing system. An empirical example of three Upper Midwest corn markets presented in this paper clearly indicates the potential problems created by estimating adjustment periods using aggregated price data.

Using the concepts of "whimsical" and "fragile", as proposed by Leamer, one-way Granger causality appears rather fragile. Significant one-way causality did not appear consistently in the eight forms of data aggregation analyzed in the empirical example. In direct contrast, the instantaneous causality was significant in all eight groups of data series. This evidence indicates that identification of instantaneous causality implies a need for further disaggregation of data if valid one-way causalities are to be identified. This conclusion supports the observation of Spriggs, Kaylen and Bessler

who noted that to truly determine wheat market price leadership, intraday prices may be required.

Incorporating more stringent theoretical considerations and applying alternative econometric techniques to data analyzed for Granger causality are necessary to improve the validity of causal hypothesis testing. Brorsen, et al. proposed evaluating the dynamic multipliers of estimated causal models. As suggested in this paper, theoretical expectations about the characteristics of these multipliers may indicate the adequacy of a model's specification. Also, Blank and Schmiesing have proposed that path analysis can be combined with causality tests to more adequately assess prices in a spatial equilibrium model.

Further research is needed on the implications of time aggregation for analysis of Granger causality tests. Specifically, the question of how interpretation of Granger causality is affected must be resolved if the technique is to be a credible tool in spatial equilibrium analysis.

Footnotes

1. Jacobs, Leamer and Ward define "informativeness" as the usefullness of one variable in predicting another.

2. The inability to identify the autoregressive parameters has been referred to as being a "...manifestation" of the aliasing problem of spectral analysis..."(Tesler).

3. According to Leamer: "In order to draw inferences from data as described by econometric texts, it is necessary to make whimsical assumptions. The professional audience consequently and properly withholds belief until an inference is shown to be adequately insensitive (not fragile) to the choice of assumptions."

4. Subsequent estimates of dynamic multipliers were more consistent with theoretical expectations when this adjustment was made.

5. This significance level is partly attributable to the large sample size used in the daily price analysis (Jacobs, Leamer, and Ward).

6. Developing theoretical expectations may be easier for microeconomic price series than for macroeconomic estimations. Spatial equilibrium theory does, under correct conditions, guide expectations of price behavior between various markets for identical products. Technical coefficients in production processes may also give guidance in the estimation process.

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Table 1. Minimum Lag Determined by Final Prediction Error (FPE) for Selected Markets With Specified Aggregation of Corn Prices

Level of Price Aggregation	Corn Markets Analyzed		
	Minneapolis	Chicago	St. Louis
	Number of lags using:		
ALL AVAILABLE PRICE DATA			
1. Daily Prices	0	1	1
PRICES FOR ONLY ONE DAY PER WEEK			
2. Monday Prices	4	3	3
3. Tuesday Prices	7	1	1
4. Wednesday Prices	3	3	3
5. Thursday Prices	4	3	2
6. Friday Prices	3	3	0
AVERAGE PRICE FOR SPECIFIED PERIOD			
7. Weekly	4	3	3
8. Monthly	5	3	3

Table 2. F-Tests[a/] for Granger Type Causality Tests Based on Different Levels of Aggregation of the Corn Price Data.

Causality Tested	Daily Prices	Prices for Only One Day of the Week					Average Price for Period	
		Mon.	Tues.	Wed.	Thurs.	Fri.	Weekly	Monthly
1. Number of Observations	1144	206	226	227	223	218	206	45
2. Mpls <— Chicago	1.28	1.36	0.55	2.73+	0.82	1.48	0.44	0.64
—	1387.24+	106.94+	75.46+	131.57+	97.78+	186.77+	152.24+	94.79+
—>	4.10+	0.50	0.82	2.24*	2.27*	1.42	1.39	0.04
3. Mpls <— St. Louis	3.66+	0.62	0.20	0.18	1.59	1.13	0.11	1.71
—	1417.50+	118.94*	108.85+	169.90+	135.84+	176.78+	209.84+	126.06+
—>	5.21+	0.55	0.76	1.43	0.50	0.18	0.81	0.63
4. St. Louis <— Chicago	1.98+	2.08*	4.01+	2.07*	1.84	1.16	1.09	1.64
—	1177.37+	143.63+	282.75+	136.24+	137.90+	185.07+	239.11+	155.37+
—>	7.15+	0.91	0.00	0.81	4.72+	1.56	0.97	0.95

a/ The F-statistics marked with a "*" are significant at the 10 percent level while a "+" indicates significance at the 5 percent level.

Note: An arrow (—>) indicates one-way causality hypothesized as moving in the direction shown. A dash (—) indicates hypothesized instantaneous causality between the two markets.

Table 3. Estimated Adjustment in the Specific Endogenous Market Prices when the Exogenous Market Price Increased by One Cent Per Bushel

Level of Price Aggregation	Causality Relationship		
	Minneapolis and Chicago	Minneapolis and St. Louis	St. Louis and Chicago
ALL AVAILABLE PRICE DATA			
1. Daily Prices	0.89	0.98	1.04
PRICES FOR ONLY ONE DAY PER WEEK			
2. Monday Prices	1.26	0.99	1.09
3. Tuesday Prices	1.34	1.00	0.91
4. Wednesday Prices	1.19	1.04	1.09
5. Thursday Prices	1.25	1.20	1.12
6. Friday Prices	1.36	1.14	1.16
AVERAGE PRICE FOR SPECIFIED PERIOD			
7. Weekly	1.24	1.00	1.17
8. Monthly	1.48	1.46	1.17

Table 4. Number of Periods Required Before Estimated Adjustments are within 10 Percent of the Total Adjustment.

Level of Price Aggregation	Causality Relationship: Minneapolis and Chicago	Minneapolis and St. Louis	St. Louis and Chicago
	NUMBER OF PERIODS USING:		
	ALL AVAILABLE PRICE DATA		
1. Daily Prices	0	1	0
	PRICES FOR ONLY ONE DAY PER WEEK		
2. Monday Prices	2	0	2
3. Tuesday Prices	2	0	0
4. Wednesday Prices	2	0	2
5. Thursday Prices	2	2	2
6. Friday Prices	2	0	2
	AVERAGE PRICE FOR SPECIFIED PERIOD		
7. Weekly	2	0	2
8. Monthly	3	3	2