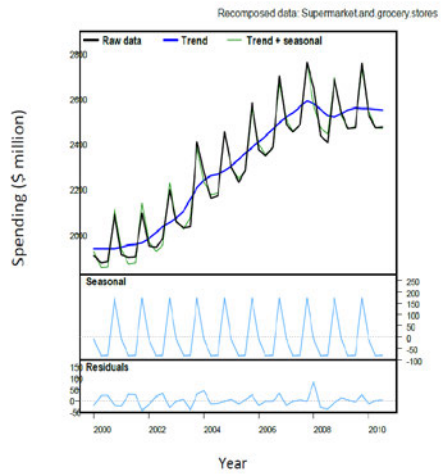
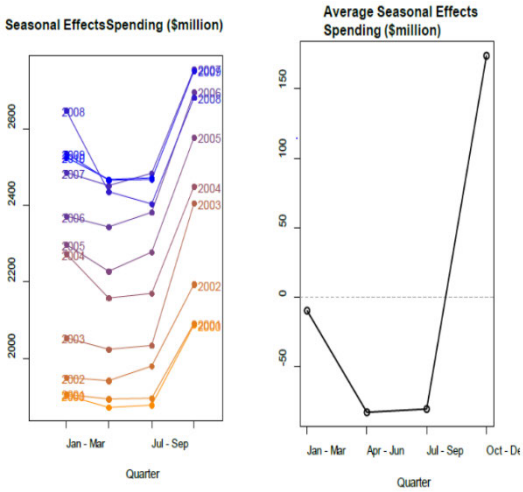
Student 1: Low Excellence

NZQA Intended for teacher use only

It has been widely publicised that both NZ and the rest of the world have recently experienced a global financial crisis towards the late 2000's. This has meant that most of society then had to closely consider how much money they were unnecessarily spending, where could they cut back and what was essential or not. According to a report from the Ministry for the Environment dated the end of April 2009 which is on the website http://www.mfe.govt.nz/environmental-reporting/consumption/household-expenditure/by-category/, the top three household consumption expenditure categories were food and beverages, housing, and transport. It also states that New Zealand's total household consumption expenditure continued to increase but the increases were not as large as in previous years.
I am going to investigate the amount of money spent in supermarket and grocery stores from 2000 to 2010 to see whether or not the overall trend is actually increasing and if there is anything unusual happening in the data. It would be interesting compare this time series with expenditure in other retail sectors. 1



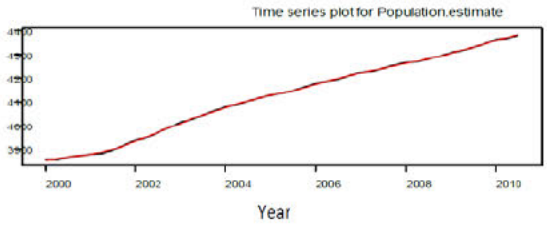
Looking at the smoothed decomposed data, there is an obvious increase in the amount of money spent at NZ supermarket and grocery stores from 2000 to the end of 2010. There is a steady increase from 2000 to towards the end of 2007 but then there is a quite a sharp fall in the trend from here till the end of 2009. The trend seems to plateau at the end of 2010 to about $2500 million per quarter. The trendline suggests that total money spent in NZ supermarket and grocery stores has increased on average from approx. $1900 million dollars in the quarter 1 2000 to $2500 million in quarter 3 2010.



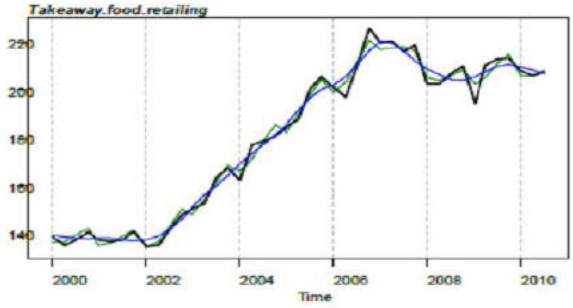
The seasonal plots show that there is an obvious seasonal pattern in the money spent on food in NZ supermarket and grocery stores with the highest sales being in Q4 each year. The average seasonal effects show that Q4 is the quarter when the most money is spent as it is about $170 million above the trend line. This of course makes sense since this quarter corresponds to the months October to December where people begin to start their Christmas shopping in preparation for Christmas dinner and fill up Christmas stockings with extra goodies. This end of this quarter is also the start of the holiday period so more money is probably spent at supermarkets and grocery stores because of social functions that occur during this time more so than the other quarters. This fits with what the superviser in the supermarket I work in told me to expect. Quarters2 and 3 which goes from April to June for Q2 then Jul-Sept for Q3 are the time when the least amount of money is spent as they are both about $80 million below the trend line.

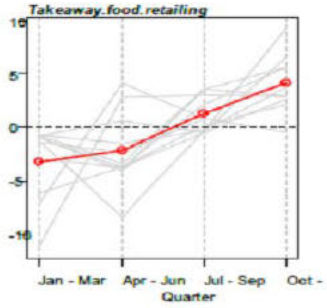
A possible reason for the increase in amount of money spent on food in NZ supermarket and grocery stores is that the population in NZ also increased during this time as shown by the population graph of NZ (see below). Since there were more people in NZ there were more people to go into such stores and so there was more money to spend. The appearance of the population graph and supermarket and grocery stores graph are similar at the beginning as they are both quite level. But the population graph

continues to increase and doesn't level off towards the end as the supermarket and grocery store graph does.



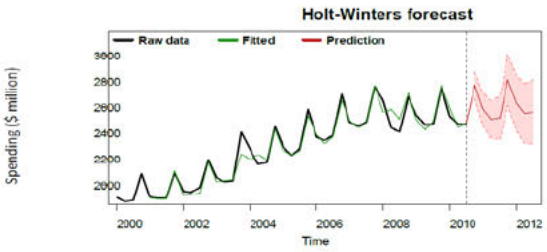
There may have also been some sort of down turn in the economy e.g global financial crisis, that could have accounted for such a sharp fall in supermarket sales towards the end of 2007. I would need to research this further to see if these two events coincided and compare to see if the same decrease in spending occurred on takeaway food at the same time.





When takeaway sales are compared to supermarket and grocery sales graphs both show a slight growth They both start to increase quite sharply, with spending at supermarket and grocery stores from increasing 2001 and spending on takeaways from 2002. A decrease in spending occurred in supermarket and grocery stores from the end of 2007 start of 2008 but spending on takeaways decreased from 2007. The seasonal pattern for each quarter is much more varied. These are similar timeframes so perhaps there was a reason for this. Finance companies in NZ started to collapse and go into receivership around these times e.g. Bridgecorp, Capital and Merchant with huge losses. There was also a global financial crisis that occurred at this time which meant that people would not have as much money to spend on themselves especially luxuries such as takeaways. This could explain the trend we see in the data. (2) (2)

Using the holt-winters model for calculating forecasts I estimate that the total amount of money spent on food in Supermarket and Grocery in NZ in Q4 2010 is 2770 million dollars but could be between $2666 and $2867 million dollar, for Q4 2011 the total amount spent is predicted to be $2810 million dollars but could be between $2614 and $3008 million dollars.



Using such a model to make forecasts assumes that the seasonal pattern of total amount of money spent in Supermarket and Grocery in NZ is reasonable constant and not too varied. The fitted model fits the data fairly well (apart from just after 2004 and 2008) and the seasonal effects have remained relatively constant but with some small variation in the first and last quarters. Therefore I am reasonably confident that my forecasts are accurate. (3)

Looking at the residual plot most residuals are within $50 million of the trendline. The overall range of the raw data is $884 million (maximum – minimum = 2756-1872) so a residual of $50 million is quite small in proportion to $884 million. The exception would be the unusual residuals from Q1 2004 which is right on the $50 million mark and Q1 2008 which is about $75 million above the trendline. There is also a bit of a difference between the raw and fitted data for these times looking at the holt-winters plot.