Figure 1: Graphs frrom original series

1 Summary

Briefly three additions to the x12arima facilities in gretl are proposed

1. An amendment to the graphics output of the x12arima interface in gretl to improve these graphs when there are missing values.

2. A greater emphasis on the .err file to ensure that the user is aquainted with possible problems in the seasonal adjustment process.

3. The inclusion of a trading day option in the gretl interface to x12arima.

2 Missing Values in x12arima graphs

I will use Hendrique Andrade's original series teste from his file test.gdt attached to his email of 8 September. The file teste.gdt attached to this email contains several other series derived from that file.

The gretl graphs produced during the adjustment of the original series are given in figure 1
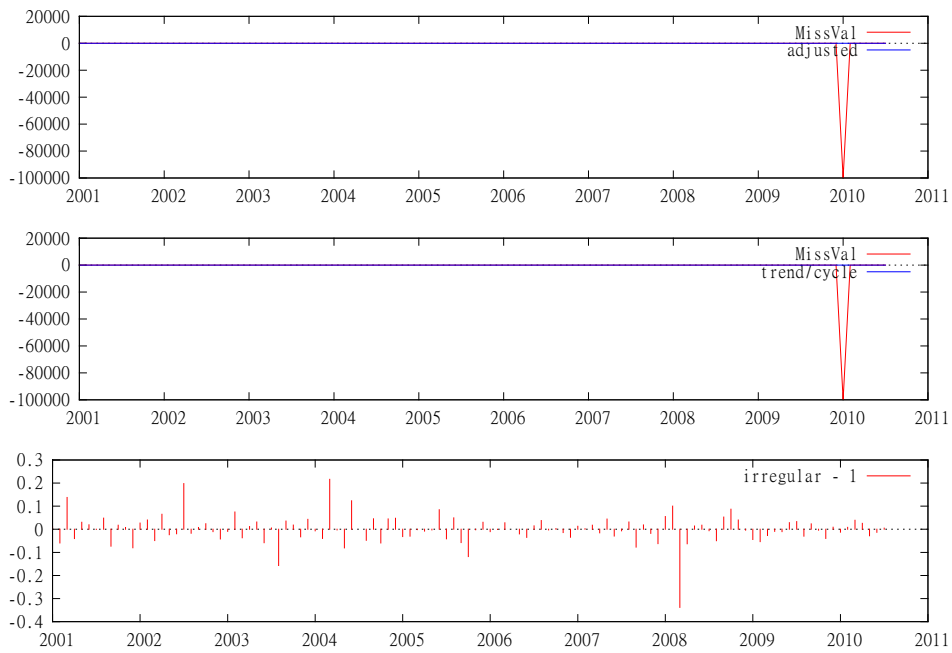
Figure 2: Graphs frrom original series

To illustrate the effect of a missing value code of -99999 I replaced the January 2010 value in the teste series by -99999, creating a new series MissVal. The default gretl x12arima graphics for this series are in figure 2

It is clear that the existence of the -99999 values takes away from the usefullness of the top two graphs in figure 2. The x12 b1 series (the original series adjusted for missing values and outliers) might be more useful than the series used in the graph.

3 Input Errors and Warnings

To quote from page 7 of the x12arima manual

> *Input errors are reported as they are discovered by the program, which then prints appropriate error messages. These error messages are also stored in a file named pathnfilename.err. When the program can localize the error, the line in the spec file containing the error will be printed out with a caret ($\hat{}$) positioned under the error. If the program cannot localize the error, then only the error message will be printed. If the error is fatal, then ERROR: will be displayed before the error message, sometimes with suggestions about what to change. For nonfatal errors, WARNING: will be printed before the message. WARNING messages are also used sometimes to call attention to a situation in which no error has been committed, but some caution is appropriate.*
>
> *X-12-ARIMA first reads the whole spec file, reporting all input errors it fnds. This way the user can try to correct more than one input error per run. Frequently, however, the only informative messages are those for the first one or two errors. These errors may result in other errors, especially if input errors occur in the series spec. The program will stop if any fatal errors are detected. Warnings will not stop the program, but should alert users to check both the input and output carefully to verify that the desired results are produced.*

In the teste or missval series there are warnings about problems with (lack of) trading day adjustments in the .err file. If one runs the x12a program the warnings appear in the console output from the x12a program and in the .err file. The gretl program only displays the .err file if there is an input error and the program does not run. The .err file contains warnings it is worthwhile examining. Thus I feel that either the .err file or the x12a console output should be reproduced in a gretl window after each x12a run.

4 Trading day adjustment

To correct for the trading day problems in the teste series I adjusted the x12a spec file derived from the gretl run by adding `regressionvariables=(const, td)` to the specification.

```
series{
 period=12
 title="testetd"
 start=2001.1
 data=(
2.44242 2.06569 2.7564 2.32389 2.58068 2.35682 2.4838
2.56693 2.0246 2.23309 1.95265 1.5527 1.91115 1.75875
1.7979 1.99489 1.90233 1.80959 2.41727 2.06787 1.99527
```

```
2.14675 1.94359 1.70031 1.94852 1.93438 1.9655 2.02454
2.15763 1.91898 2.25941 2.05011 2.43538 2.55376 2.31279
2.26303 2.3231 2.04155 3.01209 2.41058 2.41362 2.95703
2.91066 3.04607 3.1909 3.04472 3.21475 2.9296 2.88241
2.5542 3.104 2.876 3.147 3.41 3.229 3.785
3.162 3.079 3.342 3.18 3.331 2.964 3.708
3.242 3.549 3.55 4.078 4.558 4.125 4.354
4.053 3.61378 4.221 3.702 4.743 4.115 4.946
4.698 5.276 5.888 5.091 6.045 5.632 4.974
6.429 6.014 4.601 5.859 7.254 7.477 8.122
8.026 8.297 8.43 6.772 5.153 4.883 3.752
4.406 3.819 4.286 4.68 5.452 5.42 5.843
6.113 5.605 5.441 5.627 5.629 7.231 6.318
6.55 6.725 7.534  )
}
regression{variables=(const, td)}
transform{function=auto}
outlier{}
automdl{}
x11{ save=( d11 ) }
```

The effect of this adjustment is to estimates trading day effects before seasonal adjustment. A run of the x12a program with this trading day adjustment produced the data series testedt_d112 which has been imported into gretl and saved in teste.gdt. You will see that there are sizable differences in the seasonally adjusted series with and without prior trading day adjustment.

At one time it was commom practice to examine most flow series for trading day effects. I recent years it is possible that trading day effects are less important but I think that they may still be relevant. While I do not know the nature of the teste series trading day adjustment is important. It would be useful if an optional trading day adjustment was possible.