Title

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tsappend — Add observations to a time-series dataset

Description

`tsappend` appends observations to a time-series dataset or to a panel dataset. `tsappend` uses and updates the information set by `tsset` or `xtset`. Any gaps in the dataset are removed.

Quick start

Add 10 time periods to `tsset` data

```
tsappend, add(10)
```

Incorporate additional months to data up to the third month of 1999

```
tsappend, last(1999m3) tsfmt(tm)
```

Add 2 time periods to the panel identified by `pvar` = 333 after `xtset pvar tvar`

```
tsappend, add(2) panel(333)
```

Menu

Statistics > Time series > Setup and utilities > Add observations to time-series dataset

Syntax

```
tsappend , { add(#) | last(date | clock) tsfmt(string) } [ options ]
```

options	Description
* add(#)	add # observations
* last(*date* | *clock*)	add observations at *date* or *clock*
* tsfmt(*string*)	use time-series function *string* with last(*date* | *clock*)
panel(*panel_id*)	add observations to panel *panel_id*

* Either add(#) is required, or last(*date* | *clock*) and tsfmt(*string*) are required.
You must tsset or xtset your data before using tsappend; see [TS] **tsset** and [XT] **xtset**.
collect is allowed; see [U] **11.1.10 Prefix commands**.

Options

add(#) specifies the number of observations to add.

last(*date* | *clock*) and tsfmt(*string*) must be specified together and are an alternative to add().

last(*date* | *clock*) specifies the date or the date and time of the last observation to add.

tsfmt(*string*) specifies the name of the Stata time-series function to use in converting the date specified in last() to an integer. The function names are tc (clock), tC (Clock), td (daily), tw (weekly), tm (monthly), tq (quarterly), and th (half-yearly).

For clock times, the last time added (if any) will be earlier than the time requested in last(*date* | *clock*) if last() is not a multiple of delta units from the last time in the data.

For instance, you might specify last(17may2007) tsfmt(td), last(2001m1) tsfmt(tm), or last(17may2007 15:30:00) tsfmt(tc).

panel(*panel_id*) specifies that observations be added only to panels with the ID specified in panel().

Remarks and examples

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Remarks are presented under the following headings:

Introduction

tsappend adds observations to a time-series dataset or to a panel dataset. You must tsset or xtset your data before using tsappend. tsappend simultaneously removes any gaps from the dataset.

There are two ways to use tsappend: you can specify the add(#) option to request that # observations be added, or you can specify the last(*date* | *clock*) option to request that observations be appended until the date specified is reached. If you specify last(), you must also specify tsfmt(). tsfmt() specifies the Stata time-series date function that converts the date held in last() to an integer.

tsappend works with time series of panel data. With panel data, tsappend adds the requested observations to all the panels, unless the panel() option is also specified.

Using tsappend with time-series data

tsappend can be useful for appending observations when dynamically predicting a time series. Consider an example in which tsappend adds the extra observations before dynamically predicting from an AR(1) regression:

```
. use https://www.stata-press.com/data/r17/tsappend1
. regress y l.y
```

Source	SS	df	MS	Number of obs	=	479
				F(1, 477)	=	119.29
Model	115.349555	1	115.349555	Prob > F	=	0.0000
Residual	461.241577	477	.966963473	R-squared	=	0.2001
				Adj R-squared	=	0.1984
Total	576.591132	478	1.2062576	Root MSE	=	.98334

y	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
y						
L1.	.4493507	.0411417	10.92	0.000	.3685093	.5301921
_cons	11.11877	.8314581	13.37	0.000	9.484993	12.75254

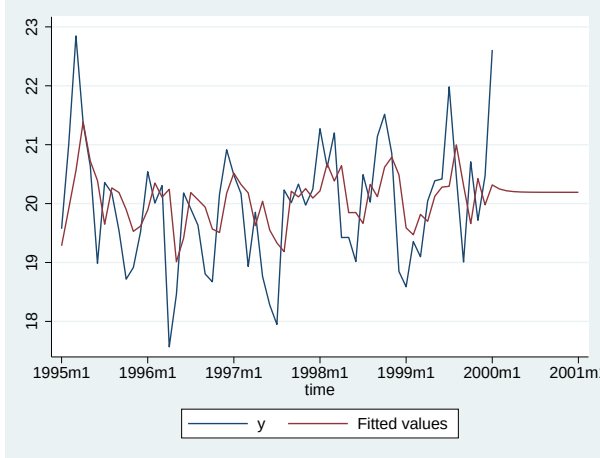
```
. matrix b = e(b)
. matrix colnames b = L.xb one
. tsset
Time variable: t2, 1960m2 to 2000m1
        Delta: 1 month
. tsappend, add(12)
. tsset
Time variable: t2, 1960m2 to 2001m1
        Delta: 1 month
. predict xb if t2<=tm(2000m2)
(option xb assumed; fitted values)
(12 missing values generated)
. generate one=1
. matrix score xb=b if t2>=tm(2000m2), replace
```

The calls to tsset before and after tsappend were made without a time variable; thus both commands display how the data are currently tsset. The results from the first tsset command show that we have monthly data and that our time variable, t2, starts at 1960m2 and ends at 2000m1.

tsappend with the add(12) option used these results to add 12 months to the dataset. The results of the second tsset command show that this new year of data has been added, as shown by the end year now being 2001m1. We could have skipped these calls to tsset, but they are shown here to illustrate how tsappend uses and updates time-series settings of the dataset.

We then used predict and matrix score to obtain the dynamic predictions, which allows us to produce the following graph:

```
. line y xb t2 if t2>=tm(1995m1), ytitle("") xtitle("time")
```



In the call to `tsappend`, instead of saying that we wanted to add 12 observations, we could have specified that we wanted to fill in observations through the first month of 2001:

```
. use https://www.stata-press.com/data/r17/tsappend1, clear
. tsset
Time variable: t2, 1960m2 to 2000m1
        Delta: 1 month
. tsappend, last(2001m1) tsfmt(tm)
. tsset
Time variable: t2, 1960m2 to 2001m1
        Delta: 1 month
```

We specified the `tm()` function in the `tsfmt()` option. [FN] **Date and time functions** contains a list of time-series functions for converting date literals to integers. Because we have monthly data, and since [FN] **Date and time functions** tells us that we want to use the `tm()` function, we specified the `tsfmt(tm)` option. The following table shows the most common types of time-series data, their formats, the appropriate conversion functions, and the corresponding options for `tsappend`:

Description	Format	Function	Option
time	`%tc`	`tc()`	`tsfmt(tc)`
time	`%tC`	`tC()`	`tsfmt(tC)`
daily	`%td`	`td()`	`tsfmt(td)`
weekly	`%tw`	`tw()`	`tsfmt(tw)`
monthly	`%tm`	`tm()`	`tsfmt(tm)`
quarterly	`%tq`	`tq()`	`tsfmt(tq)`
half-yearly	`%th`	`th()`	`tsfmt(th)`
yearly	`%ty`		

For yearly data, no conversion function or `tsfmt()` is necessary; years are numeric and do not need to be converted.

Using tsappend with panel data

tsappend's actions on panel data are similar to its action on time-series data, except that tsappend performs those actions on each time series within the panels. To work within panels, a panel variable must have been specified with tsset or xtset. It does not matter which command you use; the two are equivalent.

If the end dates vary over panels, last() and add() will produce different results. add(#) always adds # observations to each panel. If the data end at different periods before tsappend, add() is used, the data will still end at different periods after tsappend, add(). In contrast, tsappend, last() tsfmt() will cause all the panels to end on the specified last date. If the beginning dates differ across panels, using tsappend, last() tsfmt() to provide a uniform ending date will not create balanced panels because the number of observations per panel will still differ.

Consider the panel data summarized in the output below:

```
. use https://www.stata-press.com/data/r17/tsappend3, clear
. xtdescribe
      id:  1, 2, ..., 3                                   n =          3
      t2:  1998m1, 1998m2, ..., 2000m1                    T =         25
           Delta(t2) = 1 month
           Span(t2)  = 25 periods
           (id*t2 uniquely identifies each observation)

Distribution of T_i:   min      5%     25%       50%       75%     95%     max
                        13      13      13        20        24      24      24

     Freq.  Percent    Cum. |  Pattern
 ---------------------------+-------------------------------
         1     33.33   33.33 |  ............1111111111111
         1     33.33   66.67 |  1111.11111111111111111111
         1     33.33  100.00 |  11111111111111111111.....
 ---------------------------+-------------------------------
         3    100.00         |  XXXXXXXXXXXXXXXXXXXXXXXXX
. by id: summarize t2

-------------------------------------------------------------------------------
-> id = 1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         13         474     3.89444       468        480
-------------------------------------------------------------------------------
-> id = 2

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         20       465.5     5.91608       456        475
-------------------------------------------------------------------------------
-> id = 3

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         24    468.3333    7.322786       456        480
```

The output from xtdescribe and summarize on these data tells us that one panel starts later than the other, that another panel ends before the other two, and that the remaining panel has a gap in the time variable but otherwise spans the entire time frame.

Now consider the data after a call to `tsappend, add(6)`:

```
. tsappend, add(6)
. xtdescribe
      id:  1, 2, ..., 3                                       n =          3
      t2:  1998m1, 1998m2, ..., 2000m7                        T =         31
           Delta(t2) = 1 month
           Span(t2)  = 31 periods
           (id*t2 uniquely identifies each observation)

Distribution of T_i:   min      5%     25%       50%       75%      95%      max
                        19      19      19        26        31       31       31

     Freq.  Percent    Cum. |  Pattern
 ---------------------------+-----------------------------------------------
         1     33.33   33.33 |  ............111111111111111111
         1     33.33   66.67 |  111111111111111111111111.....
         1     33.33  100.00 |  111111111111111111111111111111
 ---------------------------+-----------------------------------------------
         3    100.00         |  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

. by id: summarize t2
-------------------------------------------------------------------------------
-> id = 1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         19         477    5.627314       468        486
-------------------------------------------------------------------------------
-> id = 2

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         26       468.5    7.648529       456        481
-------------------------------------------------------------------------------
-> id = 3

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         31         471    9.092121       456        486
```

This output from `xtdescribe` and `summarize` after the call to `tsappend` shows that the call to `tsappend, add(6)` added 6 observations to each panel and filled in the gap in the time variable in the second panel. `tsappend, add()` did not cause a uniform end date over the panels.

The following output illustrates the contrast between `tsappend, add()` and `tsappend, last() tsfmt()` with panel data that end at different dates. The output from `xtdescribe` and `summarize` shows that the call to `tsappend, last() tsfmt()` filled in the gap in `t2` and caused all the panels to end at the specified end date. The output also shows that the panels remain unbalanced because one panel has a later entry date than the other two.

```
. use https://www.stata-press.com/data/r17/tsappend2, clear
. tsappend, last(2000m7) tsfmt(tm)
. xtdescribe
      id:  1, 2, ..., 3                                     n =          3
      t2:  1998m1, 1998m2, ..., 2000m7                      T =         31
           Delta(t2) = 1 month
           Span(t2)  = 31 periods
           (id*t2 uniquely identifies each observation)

Distribution of T_i:   min      5%      25%       50%       75%      95%      max
                        19      19       19        31        31       31       31

     Freq.  Percent    Cum. |  Pattern
 ---------------------------+-------------------------------------------
        2     66.67   66.67 |  11111111111111111111111111111111
        1     33.33  100.00 |  ............111111111111111111
 ---------------------------+-------------------------------------------
        3    100.00          |  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

. by id: summarize t2
-------------------------------------------------------------------------------
-> id = 1
    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         19         477    5.627314       468        486
-------------------------------------------------------------------------------
-> id = 2
    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         31         471    9.092121       456        486
-------------------------------------------------------------------------------
-> id = 3
    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
          t2 |         31         471    9.092121       456        486
```

Stored results

`tsappend` stores the following in `r()`:

Scalars

`r(add)`	number of observations added

Also see

[TS] **tsset** — Declare data to be time-series data

[XT] **xtset** — Declare data to be panel data