Housing units under construct in the US

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Introduction

The current housing inventory continues to slip (2018), driving up home prices and limiting home buyers across the U.S. One might wonder whether building a new home is a good investment. Others might wonder what types of housing units they should consider. Analyzing Housing Units Under Construction data from St Louis Federal Reserve Economic Database (FRED) will give us some insights on how the housing market is going in the next couple of years.

Data

Data from FRED was available for three main types of housing units as well as the total:

- New Privately-Owned Housing Units Under Construction: 1-Unit Structures (UNDCON1USA)
- New Privately-Owned Housing Units Under Construction: 2-4 Unit Structures (UNDCON24USA)
- New Privately-Owned Housing Units Under Construction: 5-Unit Structures or More (UNDCON5MUNSA)
- New Privately-Owned Housing Units Under Construction: Total (UNDCONTSA)

Analysis

Let's start by loading necessary packages

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------- tidyverse 1.2.1 -
-
```

```
## v ggplot2 2.2.1     v purrr   0.2.4
## v tibble  1.4.1     v dplyr   0.7.4
## v tidyr   0.8.0     v stringr 1.2.0
## v readr   1.1.1     v forcats 0.3.0
```

```
## -- Conflicts ------------------------------------ tidyverse_conflicts() -
-
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(quantmod)

## Loading required package: xts

## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

##
## Attaching package: 'xts'

## The following objects are masked from 'package:dplyr':
##
##     first, last

## Loading required package: TTR

## Version 0.4-0 included new data defaults. See ?getSymbols.

library(data.table)

##
## Attaching package: 'data.table'

## The following objects are masked from 'package:xts':
##
##     first, last

## The following objects are masked from 'package:dplyr':
##
##     between, first, last

## The following object is masked from 'package:purrr':
##
##     transpose

library(viridis)

## Loading required package: viridisLite

library(htmlTable)
library(knitr)
```

Load available data from the website on to the dataframe *my.names*

```
my.names <-
data.table(var=c("UNDCON1USA","UNDCON24USA","UNDCON5MUNSA","UNDCONTSA"),
                        name=c("1-unit","2-4 unit","5-unit","total"),
                        Description=c("1-Unit Structures",
                                      " 2-4 Unit Structures",
                                      "5-Unit Structures",
                                      "Total"),
                        Source=c("U.S. Bureau of the Census",
                                 "U.S. Bureau of the Census",
                                 "U.S. Bureau of the Census",
                                 "U.S. Bureau of the Census"))
```

Make a descriptive data table

```
htmlTable(my.names, caption="Data description")
```

Data description
var
name
Description
Source
1
UNDCON1USA
1-unit
1-Unit Structures
U.S. Bureau of the Census
2
UNDCON24USA
2-4 unit
2-4 Unit Structures
U.S. Bureau of the Census
3
UNDCON5MUNSA
5-unit
5-Unit Structures
U.S. Bureau of the Census
4
UNDCONTSA
total
Total
U.S. Bureau of the Census

Then, use Quantmod to load data

```
df= getSymbols('UNDCON1USA',src='FRED', auto.assign=F)
```

```
## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.
```

Next, we slice off necessary data and assign to appropriate smaller dataframes

```
df = data.frame(date=time(df), coredata(df) )

df.24 =getSymbols('UNDCON24USA',src='FRED', auto.assign=F)
df.24 = data.frame(date=time(df.24), coredata(df.24) )

df.5=getSymbols('UNDCON5MUNSA',src='FRED', auto.assign=F)
df.5 = data.frame(date=time(df.5), coredata(df.5) )

df.all= getSymbols('UNDCONTSA',src='FRED', auto.assign=F)
df.all = data.frame(date=time(df.all), coredata(df.all) )
```

Merge and consolidate all data by "date" to graph them together in 1 graph

```
#Merge
df3<-merge(df,df.24,by="date")
df3<-merge(df3,df.5,by="date")
df3<-merge(df3,df.all,by="date")
dt<-data.table(df3)
# Consolidate the data
dt %>% gather(var,value,-date) %>% data.table() ->dt2

# Merge on variable names
dt2<-merge(dt2,my.names,by="var")
```

Transform data prior to plotting to make the data look 'normal'

```
dt2=dt2[,id:=1:.N, by=var]  # Index running from 1:N by group (var)
dt2=dt2[,var0:=100*value/sum(ifelse(id==1,value,0)),by=var] #create index
```

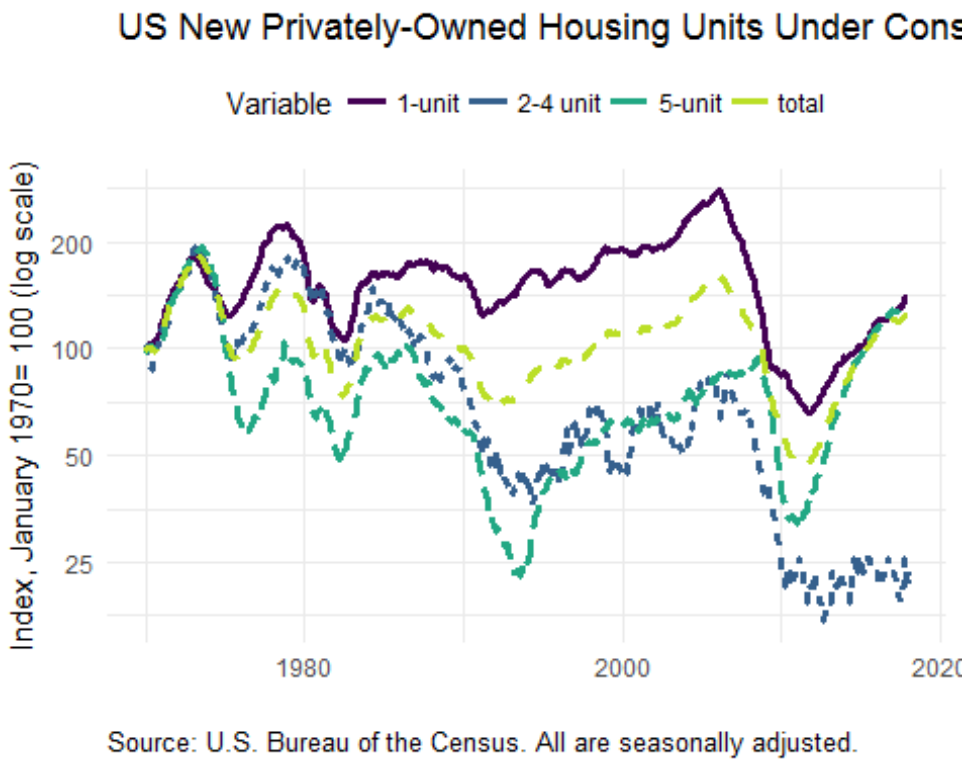
Finally, we can plot and have a good look at the data

```
# Create caption
mycaption<- "Source: U.S. Bureau of the Census. All are seasonally adjusted."

# Wrap caption 120 characters:
mycaption <- paste0(strwrap(mycaption, 120), sep="", collapse="\n")


# Create Plot
ggplot(data=dt2,aes(x=date,y=var0,color=name,linetype=name))+
```

```
  geom_line(size=1.1)+
  scale_y_log10(breaks=c(25,50,100,200,400))+
  theme_minimal()+theme(plot.caption=element_text(hjust=0),
                        legend.position="top")+
  guides(linetype=F)+
  scale_color_viridis(name="Variable",discrete=T,end=0.9)+
  labs(x="",y="Index, January 1970= 100 (log scale)",
       title=" US New Privately-Owned Housing Units Under Construction",
       caption=mycaption)
```



Source: U.S. Bureau of the Census. All are seasonally adjusted.

Result

While new construction for duplexes (2-units) has been flat since the Great Depression of 2008, construction of other types of units have been increasing since then. This translates to an increase in total new construction and can potentially quench the thirst for the housing market in the near future. Are Americans no longer interested in duplexes?