

## DK – Denmark

Statistics Denmark publishes a nationwide house price index for new and existing, single-family dwellings. The index is constructed using the sale price appraisal ratio (SPAR) method. First, the ratio of the average purchase price and the average property assessment is computed for each region. Then, the index is created by dividing the ratio of the current quarter by the ratio of the previous quarter and multiplying the outcome by the index of the previous quarter (Dutot index). The appraisal value of dwelling stock is used to weight ratios from different regions. Since we choose to focus only on single-family dwellings, no aggregation across property type is possible. An improved SPAR method was implemented in the second quarter of 1992. The quarterly series from Statistics Denmark begins in the first quarter of 1992 and is indexed to 2006=100.

The Danish Central Bank—relying on data from the Ministry of Taxation (SKAT)—constructs another quarterly house price series going back to the first quarter of 1971 to be used for its MONA quarterly macroeconomic model for Denmark. The series is indexed to 1980=100 and can be obtained from the MONA databank. SKAT also uses the SPAR method to construct a house price index, though sales data is restricted to free sales (not involving family members). This MONA house price index also measures prices for new and existing, single-family dwellings. We use the growth rates of this series to extend the series from Statistics Denmark back to the first quarter of 1975.

Statistics Denmark stopped seasonally adjusting their house price index in 2009 with the introduction of an electronic land registry database. We seasonally-adjust the spliced series using the BSTS model and re-base the series to 2005=100. We deflated this house price series using the Personal Consumption Expenditure (PCE) deflator obtained from the OECD Economic Outlook database, but this PCE deflator series was discontinued in November 2012. This affects the first quarter 2012 update and all subsequent updates. Current data is now obtained from the OECD National Accounts database. The series is reported at a quarterly frequency and begins in the first quarter of 1991. We use the quarterly growth rates of the discontinued OECD Outlook database 91 series to extend the current data to the first quarter of 1975.

We complete the Danish data by reporting Personal disposable income (PDI) on a *per capita* basis. The current PDI series was obtained from the OECD Economic Outlook database—then interpolated, spliced and seasonally adjusted. We also took an interpolated working-age population series from the OECD Economic Outlook database. The source of the current PDI and working age population data has changed, affecting the PDI *per capita* series in the 2012 first quarter update and all subsequent updates. Gross disposable income and consumption of fixed capital for households is collected from Eurostat. Both series are reported at a quarterly frequency and begin in 1999. Consumption of fixed capital is subtracted from gross disposable income series to produce PDI.

The net disposable income series from Eurostat is largely influenced by seasonal factors, so we use a BSTS model in state-space form to identify and systematically extract the seasonal and excessively volatile components of the data. We use two annual series to extend the PDI series back to 1975. From 1981 to 1998 we use the net disposable income series from the OECD Outlook 86 database. From 1975 to 1980 we use the net disposable income series from the

OECD Outlook 61 database. The two annual series are spliced together, and then interpolated to a quarterly frequency using the quadratic-match average method. The resulting quarterly growth rates are used to extend the Eurostat series.

Current working age population data is now obtained from the OECD Main Economic Indicators database. It is reported at a quarterly frequency and begins in the first quarter of 1999. We use the quarterly growth rates of the discontinued working age population series from the OECD Economic Outlook 90 database to extend the series to the first quarter of 1975. We then divide the spliced PDI series by the extended working age population series to create a nominal PDI *per capita* series. We use the PCE deflator to report the PDI *per capita* series in real terms. Both nominal and real PDI measures are re-based to 2005=100.

#### *References:*

Danmarks Nationalbank (2003): “MONA - A Quarterly Model of the Danish Economy.”  
Joensen (2006): “Danish Real Estate Price Indexes and Their Principal Users.”

#### *Information Resources:*

Statistics Denmark Data

<http://www.dst.dk/en/Statistik/dokumentation/Declarations/sales-of-real-property.aspx>

Denmark Tax Authority (SKAT)

<http://www.skat.dk/SKAT.aspx?oId=1812700>

Realkreditrådet – Association of Danish Mortgage Banks

<http://www.realkreditraadet.dk/Statistics.aspx>

[http://www.realkreditraadet.dk/Statistics/Prices\\_and\\_trades\\_of\\_owner\\_occupied\\_homes.aspx](http://www.realkreditraadet.dk/Statistics/Prices_and_trades_of_owner_occupied_homes.aspx)

Eurostat Data

[http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search\\_database](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database)

Acknowledgements: Jacob Holmgaard from Statistics Denmark, Jan Falk Rasmussen from SKAT, and Tina Saaby Hvolbøl from the Danmarks Nationalbank.