Eric Fesselmeyer, Haoming Liu, and Alberto Salvo, "Declining Discount Rates in Singapore's Market for Privately Developed Apartments", *Journal of Applied Econometrics*, forthcoming.

ReadMe file on data and code prepared in November 2020, revised December 2020

Note: Stata do-files and Matlab .m files can be read as text files in any text editor.

The following files containing source data and computer code are described in what follows:

(i) data_transactions.dta: read by Stata (39 MB, full sample of transactions with 179,218 observations, 24 variables). The content of this and other .dta files is additionally provided as CSV text files.

(ii) cpi_monthly.dta: read by Stata (5 KB, 315 year-month observations, 3 variables).

(iii) code_descriptive.do: runs in Stata.

(iv) code_stata_to_matlab.do: runs in Stata.

(v) data_all.txt: the user can prepare this text file in Stata using the above data and code. For use in Matlab; shared for convenience in folder "data files for matlab".

(vi) data_zip_999andfreeh.txt: the user can prepare this text file in Stata using the above data and code. For use in Matlab; shared for convenience in folder "data files for matlab".

(vii) data_buyer_age.txt: the user can prepare this text file in Stata using the above data and code. For use in Matlab; shared for convenience in folder "data files for matlab".

(viii) post5_tsample_1.mat – post5_tsample_2.mat and post5_xsample_1.mat – post5_xsample_20.mat: 22 files. For use in Matlab: jackknife adjustment of models with 5-digit location controls; shared in folder "data files for matlab".

(ix) post3_tsample_1.mat – post3_tsample_2.mat and post3_xsample_1.mat – post3_xsample_20.mat: 22 files. For use in Matlab: jackknife adjustment of models with 5-digit location controls; shared in folder "data files for matlab".

(x) post5_fold_1.mat – post5_fold_10.mat: 10 files. For use in Matlab: cross-validation of models with 5-digit location controls; shared in folder "data files for matlab".

(xi) post3_fold_1.mat – post3_fold_10.mat: 10 files. For use in Matlab: cross-validation of models with 3-digit location controls; shared in folder "data files for matlab".

(xii) Several folders labeled with table and column numbers, containing Matlab .m files reproducing the corresponding table's estimates.

(xiii) TableA4.xlsx: read by Excel (18 KB).

(xiv) data_rent.dta: read by Stata (13.8 MB, full sample of rental contracts with 114,918 observations, 17 variables).

Script file (iii) code_descriptive.do runs in Stata version 15 or higher. This do-file consists of several programs (functions). The user needs to manually change the working directory to the folder in which h/she will save the source data files (i) and (ii) (and (xiv) for rental price regressions). The do-file creates a temporary folder in the D drive and saves temporary files to this folder.

Program "housekeeping" of do-file (iii) constructs the sample from the transaction data, available in the Stata 15 dataset (i) data_transactions.dta (or, equivalently, in data_transactions.csv). Please refer to the variable labels for further description. For convenience, variable labels are reproduced at the end of this ReadMe file. Note that a few variables have missing values, as described in Table 1. Transaction prices are adjusted for variation in Singapore's Consumer Price Index, available in the Stata 15 dataset (ii) cpi_monthly.dta, and account for prepayment, following the procedure described in Appendix A.3. The program saves the estimation sample in the temporary folder as sample.dta.

Program "Tables1andA1toA3" reads the user-generated estimation sample (sample.dta) and replicates descriptive Tables 1 and A.1 and the OLS regression estimates reported in Tables A.2 and A.3.

Programs "figureA2" and "figureA3" replicate Figures A.2 and A.3, respectively.

Program "TableA12" reads the sample of rental contracts, available in the Stata 15 dataset (xiv) data_rent.dta, and adjusts rental prices for variation in Singapore's Consumer Price Index (cpi_monthly.dta). The program replicates the rental price regressions reported in Table A.12 ($N = 42{,}699$ rental contracts in the estimation sample).

Script file (iv) code_stata_to_matlab.do runs in Stata version 15 or higher. A single program "stata_to_matlab" takes the user-generated estimation sample in Stata (sample.dta) and formats it for use in Matlab, saving the following text files in the temporary folder:

- data_all.txt: full sample of transactions, $N = 179{,}218$, see Table 1,
- data_zip_999andfreeh.txt: transactions in areas w/ sales of at least multi-century and perpetual leases, $N = 31{,}072$, see Table 1,
- data_buyer_age.txt: transactions for which buyer age is observed, $N = 54{,}548$, see Table A.10

Program stata_to_matlab also prepares the data samples stored in .mat files (viii) to (xi), described below.

For convenience, folder “data files for matlab” already provides text files (v) data_all.txt, (vi) data_zip_999andfreeh.txt, and (vii) data_buyer_age.txt, for ready use in Matlab. These data files need to be placed in the Matlab working directory along with Matlab .m files to reproduce specific table and column estimates.

Refer to the title of different folders for Matlab .m files that reproduce specific table and column estimates, including surrounding sensitivity analysis, e.g., script file script.m in folder “Table2_cols_1a_2a” reproduces not only estimates reported in Table 2, columns 1a and 1b but also Table A.6, columns 2 and 4.

Following Section 3.3., script files for the jackknife adjustment reported in Table 2 read both the estimation sample in text file (v) data_all.txt and the Matlab files (viii) post5_tsample_*.mat and post5_xsample_* for models with 5-digit location controls or (ix) post3_tsample_*.mat and post3_xsample_* for models with 3-digit location controls. Script files for the jackknife adjustment are labeled jackknife_script.m.

Following Appendix Section A.4, script files for model cross-validation (several tables of estimates) read the Matlab files (x) post5_fold_*.mat for models with 5-digit location controls or (xi) post3_fold_*.mat for models with 3-digit location controls. Script files for model cross-validation are labeled xval_script.m. Excel file TableA.4.xlsx shows how the t-statistics of Table A.4 are computed from out-of-sample residuals.

Variables and descriptions in data_transactions.dta (or, equivalently, in data_transactions.csv). The main data source is the Urban Redevelopment Authority’s Real Estate Information System (REALIS). For projects with missing completion year in REALIS, we consulted the real-estate websites propertyguru.com.sg, iproperty.com.sg, and stproperty.sg. As noted in the article, buyer age is obtained from He et al. (2020).

projectID	"Project ID (with name label)"
projectName	"Project name"
projectLat	"Project latitude"
projectLon	"Project longitude"
completionyear	"Year construction was completed"
projectSize	"Project size (# of units)"
address	"Apartment address"
floor	"Apartment floor"
postalcode	"Building's 6-digit postal code"
buildingHeight	"Building's height (stories)"
contractyear	"Transaction year"
contractmonth	"Transaction month"
contractday	"Transaction day (of month)"
pricetransaction_nominal	"Transaction price (S$, nominal)"
pricepsm_nominal	"Price per m2 (S$, nominal)"

tenure	"Lease"
tenureRemain	"Lease upon construction completion (years, or 1000 if perpetual)"
areasqm	"Apartment size (m2)"
largeLandParcel	"Large land parcel (1=yes)"
distNearMall	"Distance to the nearest shopping mall (km)"
pool	"Project includes a swimming pool (1=yes)"
gym	"Project includes a gym (1=yes)"
tennis	"Project includes a tennis court (1=yes)"
buyerAge	"Buyer age (years)"

Variables and descriptions in cpi_monthly.dta (or, equivalently, in cpi_monthly.csv). The data source is the Monetary Authority of Singapore.

year	“Calendar year”
month	“Calendar month”
cpi	“Singapore’s Consumer Price Index (January 2014 = 100)

Variables and descriptions in data_rent.dta (or, equivalently, in data_rent.csv). The (additional) data source is the Inland Revenue Authority of Singapore.

projectName	"Project name"
completionyear	"Year construction was completed"
projectSize	"Project size (# of units)"
postalcode	"Building's 6-digit postal code"
buildingHeight	"Building's height (stories)"
rentalDate	"Date of rental agreement"
rent_nominal	"Monthly rental price (S$, nominal)"
perpetual	"Perpetual landlord lease (1=yes)"
multiCentury	"Multi-century landlord lease (1=yes)"
multiDecade	"Multi-decade landlord lease (1=yes)"
bedrooms	"Number of bedrooms"
aptSize	"Apartment size bins"
largeLandParcel	"Large land parcel (1=yes)"
distNearSubway	"Distance to the nearest subway station (km)"