Effect of Housing on Portfolio Choice: House Price Risk and Liquidity Constraint

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Outline

1. Introduction
2. *Jeonse* Contract and *Liquidity Constraint Channel*
3. Model
4. Optimal Policies
5. Empirical Analysis
6. Conclusion

Introduction

Motivation

- It is known that housing crowds out stock holdings of households.
- Two main channels are discussed in the literature. (Cocco (2005), Yao and Zhang (2005))

  - *Liquidity Constraint Channel* & *House Price Risk Channel*

- Studying these two channels separately was impossible as households get exposed to these channels simultaneously once they purchase houses.

→ **Contribution:** By exploiting unique housing tenure type called ***Jeonse*** only affected via ***liquidity constraint channel***, I study each channel's influence separately both through the model and the data.

Liquidity Constraint Channel

1. ***Liquidity Constraint Channel***

- Purchase a house $\rightarrow$ no money left to invest.
- Households need to have a certain portion of their asset in the form of illiquid housing asset. (Boar, Gorea and Midrigan 2022)
- The young are considered to be more liquidity constrained than the old because young people have most of their life time wealth in the form of illiquid future labor income.
- In this sense, for a household who has future periods to live, $\frac{Net\ Wealth}{Income}$ can be used to measure the liquidity constraints.

$\rightarrow$ Housing put a additional liquidity constraint on it

$\rightarrow$ Crowding out effect will be heterogeneous across households with different $\frac{Net\ Wealth}{Income}$ and *Age*.

House Price Risk Channel

2. ***House Price Risk Channel***

- Housing return is stochastic, which has two impacts on household stock investment.

(1) Once households buy houses, their total portfolios become riskier as they are exposed to net wealth fluctuation due to house price changes.

(2) If the stock return and housing return are negatively correlated or have low correlation, having both may decrease the total variation of their total portfolio

$\rightarrow$ Through (1), housing leads households to decrease the stock investment while (2) may lead households to increase/decrease the stock investment depending on the correlation structure.

Literature Review

- **Complete Market Life-Cycle Portfolio Choice Model**
  - Merton (1969)
- **Durable Consumption Good**
  - Grossman and Laroque (1990)
- **Exogenous Housing Position**
  - Flavin and Yamashita (2002), Faig and Shum (2002)
- **Life-Cycle Portfolio Choice Model with Endogenous Housing Choices**
  - Cocco (2005), Yao and Zhang (2005), Vestman (2019)

Jeonse Contract and *Liquidity Constraint Channel*

Jeonse Contract

- **How *Jeonse* contract is made**

(1) *Jeonse* tenant and landlord decide

- Size of *Jeonse* deposit (60-70% HP)
- Contract period (2 Years)

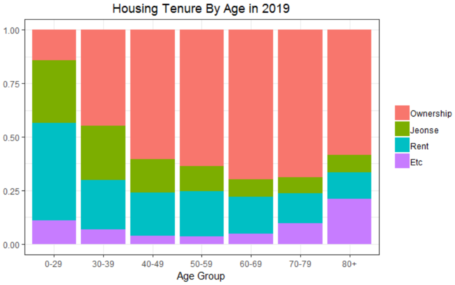
(2) *Jeonse* Tenant gives ***Jeonse* Deposit** to the landlord

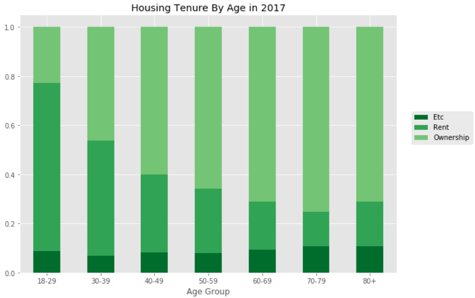
(3) *Jeonse* Tenant lives in the house while paying **no rents**

(4) *Jeonse* Tenant receives ***Jeonse* Deposit** back from the landlord

→ Tenant receives back **exactly the same amount of deposit** they paid at the beginning.

Housing Tenure Distribution in Korea and US





Korea

U.S

Fig.1. Tenure Distribution of Korea and US[1]

[1](Kor) Survey of Household Finances and Living Conditions 2019 & (US) SCF 2017

1. ***Jeonse* deposit value does not change**

- No *House Price Risk Channel*

cf) Default of landlords?

: *Jeonse* deposit insurance by HUG

: Landlord Default Cases - 23 (2016), 258 (2018) according to HUG

: Yearly Average Number of *Jeonse* contract in Seoul $\sim$ 100,000

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2. ***Jeonse* Downpayment = N Years HH Income**

- Yes *Liquidity Constraint Channel*

cf) How burdensome is the *Jeonse* deposit? ▸▸ Size of Jeonse Deposit

cf) Why do people use *Jeonse* contract? ▸▸ Tenure Choice

Jeonse Contract and *Liquidity Constraint Channel*

- Comparing **renters'** portfolio choices and ***Jeonse* tenants'** portfolio choices gives us some lessons regarding **how *Liquidity Constraint Channel* works**
- Comparing ***Jeonse* tenants'** portfolio choices and **homeowners'** portfolio choices gives us some lessons regarding what the **additional components from *House Price Risk Channel*** are

→ Study how *Jeonse* tenants invest in a stock market compared to renters or homeowners through the life-cycle portfolio choice model and household survey data.

Conclusions in Preview

(1) *Jeonse* tenureship does seem to crowd out households' stockholdings.

→ **Liquidity constraint channel exsits.**

(2) The crowding-out effect from *Jeonse* tenureship does decrease and go away if households get enough liquidity in their hands or households get older.

→ **Liquidity constraint channel seems go away once households are not liquidity constrained anymore.**

(3) The crowding-out effect from homeownership seems larger than that of *Jeonse* tenureship and it persists though households get less liquidity constrained.

→ **Larger liquidity constraint channel + house price risk channel.**

(4) Model predicts the higher risky financial asset ratio over financial asset for homeowners and *Jeonse* tenants. Data does not seem like that.

→ **Role of participation costs and return correlation structures.**

Model

Household Problem - Life Cycle Portfolio Choice

- **Life-Cycle Environment**
  - Live 30-100 / Retire at 60 / One period = 2 years / Age = a

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  - Housing expenditure $(\tau P_a^H H_a, (\delta^J + \phi_J)\bar{J} P_a^H H_a, (\delta + \phi) P_a^H H_a)$
  - Consumption (C_a), Saving decision (A_a)
  - Stock Market Participation, Portfolio choice (α_a)

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- **State variables**
  - Cash-in-hand (X_a), Labor Income (Y_a), House Price (P_a^H), Owned House Quality (H_a)
- **Exogenous Processes**
  - Labor Income, House Price, Stock Return - may be correlated

Labor Income/Stock Return/Housing Return Process

- Labor Income Process
  - $y_a = log(Y_a) = g_a + z_{i,a}, \; a \leq 15$ where $z_{i,a} = z_{i,a-1} + v_{i,a}, \; a \leq 15$
  - $y_a = log(\lambda) + g_{15} + z_{i,15}, \; a > 15$
  - $R^Y_{a+1} = \frac{Y_{a+1}}{Y_a} = exp(g_{a+1} - g_a + v_{i,a+1})$

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→ **Return processes can be correlated** (i.e. $v_{i,a}, n_a, \epsilon_a$ may be **correlated**)

Structure of Bellman Equations

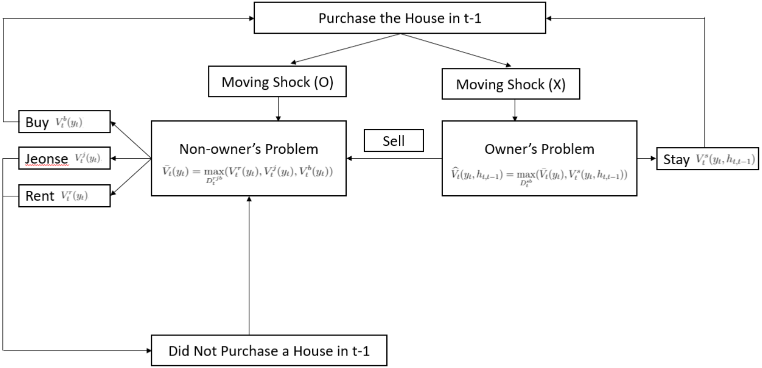

Fig2. Bellman Equation Structure

First Stage: Housing Tenure Choices

(1) If households don't have houses, they solve the non-owner's problem

$$\rightarrow \bar{V}_a(X_a, Y_a, P_a^H) = \max(V_a^r(X_a, Y_a, P_a^H), V_a^j(X_a, Y_a, P_a^H), V_a^b(X_a, Y_a, P_a^H))$$

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(2) If households have houses (H_{a-1}), they solve the owner's problem.

$\rightarrow \widehat{V}_a(X_a, H_{a-1}, Y_a, P_a^H) = \max(\bar{V}_a(X_a, Y_a, P_a^H), V_a^s(X_a, H_{a-1}, Y_a, P_a^H))$

Second Stage: Consumption/Saving/Portfolio Choices

By choosing one of the housing tenures, they arrive at the one of four problems defining four value functions below.

- V_a^r is renter's value function
- V_a^j is *Jeonse* tenant's value function
- V_a^b is new home purchaser's value function
- V_a^s is stayer's value function

Then, they solve the second stage problem which is specific for each tenure choice.

Second Stage: Renter's Problem at age a

For the household who decided to do **rent**,

$$
\begin{aligned}
V_a^r(X_a, Y_a, P_a^H) &= \max_{C_a, A_a, \alpha_a} \frac{(C_a^{1-\omega} H_a^{\omega})^{(1-\sigma)}}{1-\sigma} + \beta E_a[(1-\pi_a)\bar{V}_{a+1} + \pi_a \alpha_3 (\frac{X_{a+1}}{(P_a^H)^{\omega}})^{1-\sigma}] \\
s.t \qquad X_a &\geq A_a + C_a + \tau P_a^H H_a + 1[\alpha_a > 0]\gamma Y_a \\
X_{a+1} &= A_a R_f + \alpha_a A_a (R_{a+1} - R_f) + Y_{a+1} \\
\alpha_a &\in [0, 1],\ A_a \geq 0,\ C_a \geq 0,\ H_a \geq 0
\end{aligned}
$$

- τ : rent to price ratio

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- δ^J : Down payment ratio for *Jeonse* deposit
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Second Stage: Purchaser's Problem

For the household who decided to **buy a new house**,

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- δ: Down payment ratio for home purchase
- χ: House maintenance cost
- ϕ_b: House purchase contract fee
- ϕ: Selling costs / R_f: Risk free rate / R_M: Mortgage Rate

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- ϕ: Selling costs / R_f: Risk free rate / R_M: Mortgage Rate

Second Stage: Stayer's Problem

For the household who decided to **stay at the home** they purchased, $(H_{a-1} = H_a)$

$$V_a^S(X_a, Y_a, P_a^H, H_{a-1}) = \max_{C_a, A_a, \alpha_a} \frac{(C_a^{1-\omega} H_{a-1}^{\omega})^{(1-\sigma)}}{1-\sigma} + \beta E_a[(1-\pi_a)(\xi \bar{V}_{a+1} + (1-\xi)\hat{V}_{a+1}) + \pi_a \alpha_3 (\frac{X_{a+1}}{(P_a^H)^{\omega}})^{1-\sigma}]$$

$$s.t \qquad X_a \geq A_a + C_a + (\chi + \delta - \phi) P_a^H H_{a-1} + 1[\alpha_a > 0]\gamma Y_a$$

$$X_{a+1} = A_a R_f + \alpha_a A_a (R_{a+1} - R_f) + Y_{a+1} + P_a^H H_{a-1}(R_{a+1}^H (1-\phi) - (1-\delta) R_f)$$

$$\alpha_a \in [0,1],\ A_a \geq 0,\ C_a \geq 0$$

- δ: Down payment ratio for home purchase
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- χ: House maintenance cost
- ϕ_b: House purchase contract fee
- ϕ: Selling costs / R_f: Risk free rate / R_M: Mortgage Rate

Solution

- Normalize the model with $X_a/(P_a^H)^\omega$, house price adjusted cash-in-hand.
- Then, I have only one state variable for non-owners and two for owners.
  - $x_a = X_a/Y_a$: cash in hand over labor income.
  - $h_{a,a-1} = P_a^H H_{a-1}/X_a$: House value over cash in hand.
- For any households with certain age, certain X_a/Y_a, I can see what the optimal housing tenure choice is (Rent, *Jeonse*, Ownership) and what the optimal portfolio choices are

Meaning of the State Variables

Especially, x_a state variable has a special meaning in my model

- *A* currently has \$1,000 / is expected to earn \$10,000 in 10 years
  - Liquidity constrained household
  - $x_a = 1{,}000/(10{,}000/10) = 1.$

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  - Not liquidity constrained household
  - x_a = 100,000/(1,000/10) = 1,000.

$\rightarrow$ High $x_a = X_a/Y_a$ means no liquidity constraint

$\rightarrow$ Low $x_a = X_a/Y_a$ means highly liquidity constrained

Calibration 1

Calibrated Parameters 1		Value	Source
Discount Rate	(β)	0.96^2	Gomes and Michaelides (2005)
CRRA Parameter	(σ)	5	Gomes and Michaelides (2005)
Housing Expenditure	(ω)	0.2	Yao and Zhang (2005)
Bequest Period	(T_b)	20/2	Yao and Zhang (2005)
Moving Shock	(ξ)	2*0.04	KLIPS
Stock Market Participation Cost	(γ)	**2*0.0057**	Vissing-Jorgensen (2002) & Gomes and Michaelides (2008)
Rent to House Price Ratio	(τ)	2*0.035	Korea Real Estate Board (2012-2018).
Jeonse Deposit to House Price Ratio	($\bar{J}$)	0.645	Korea Real Estate Board (2012-2018)
Down Payment Ratio for *Jeonse*	(δ_J)	0.416	SHFLC (2012-2018)
Down Payment Ratio for Home Purchase	(δ)	0.482	SHFLC (2012-2018)
Jeonse Contract Cost	(ϕ_J)	0.003	Brokerage Fee (*Jeonse*) (2015)
House Purchase Cost	(ϕ_b)	0.0165	Acquisition Tax + Brokerage Fee (Purchase/Sell) (2015)
Selling Cost	(ϕ)	0.004	Brokerage Fee (Purchase/Sell) (2015)
Maintenance Cost	(χ)	2*0.003	Wealth Tax (2015)

Table1. Calibration 1

Calibration 2

Calibrated Parameters 2		Value	Source
Gross Risk Free Rate	(R_f)	1.023^2	Bank of Korea ECOS (2012-2018)
Gross Mortgage Rate	(R_M)	1.047^2.	Bank of Korea ECOS (2012-2018)
Expected Log Risk Premium	(μ)	**2*0.012**	Bank of Korea ECOS (2004-2018)
Expected Log Housing Return	(μ_h)	**2*0.011**	Korea Real Estate Board (2004-2018)
Standard Deviation of Labor Income Shock.	(σ_y)	2*0.045	Ahn, Chee and Kim (2021)
Standard Deviation of Stock Return Shock	(σ_ϵ)	**2*0.104**	Bank of Korea ECOS (2004-2018)
Standard Deviation of Housing Return Shock	(σ_h)	**2*0.013**	Korea Real Estate Board (2004-2018)
Correlation between Housing and Stock Return	(ρ_{hs})	**0.00**	Bank of Korea ECOS / Korea Real Estate Board (2012-2018)
Correlation between Labor Income and Stock Return	(ρ_{ys})	0.00	SHFLC / Bank of Korea ECOS(2012-2018)
Correlation between Housing Return and Labor Income	(ρ_{hy})	0.00	SHFLC / Korea Real Estate Board (2012-2018)

Table2. Calibration 2

Optimal Policies

First Stage: Housing Tenure

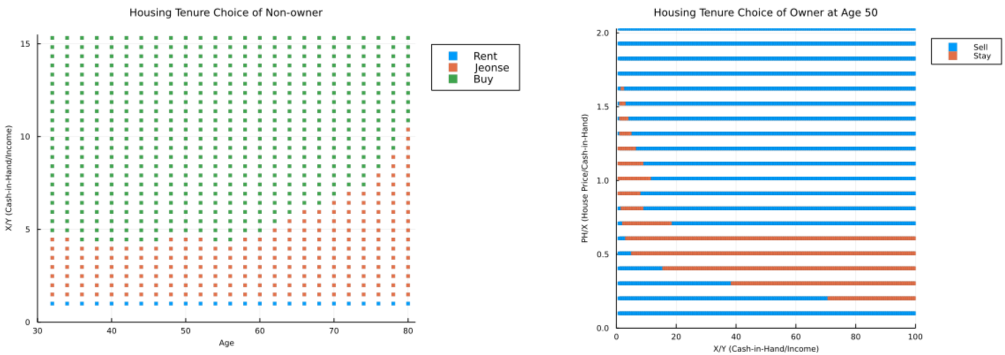

Fig3. Optimal Housing Tenure Policy

Second Stage: Definition of Portfolio Choice Variables

- **How *Net Wealth* (*NW*) is defined**
  - Renter: A_a
  - *Jeonse* Tenant: $A_a + \delta_J \bar{J} P_H H_a$
  - Homeowners: $A_a + \delta P_H H_a$

Second Stage: Definition of Portfolio Choice Variables

- **How** *Net Wealth* (*NW*) **is defined**
  - Renter: A_a
  - *Jeonse* Tenant: $A_a + \delta_J \bar{J} P_H H_a$
  - Homeowners: $A_a + \delta P_H H_a$
- **How** *Financial Asset* **and** *Risky Financial Asset* **are defined**
  - $Financial\ Asset = A_a$ for all tenures
  - $RiskyFinancial\ Asset = \alpha_a A_a$ for all tenures

Second Stage: Definition of Portfolio Choice Variables

- Three Portfolio Choice Variables
  - $FAR = \frac{Financial\ Asset(FA)}{Net\ Wealth\ (NW)}$
  - $Alpha = \frac{Risky\ Financial\ Asset(RFA)}{Financial\ Asset\ (FA)}$
  - $RFAR = \frac{Risky\ Financial\ Asset(RFA)}{Net\ Wealth\ (NW)}$

Second Stage: Definition of Portfolio Choice Variables

- Three Portfolio Choice Variables
  - $FAR = \frac{Financial\ Asset(FA)}{Net\ Wealth\ (NW)}$
  - $Alpha = \frac{Risky\ Financial\ Asset(RFA)}{Financial\ Asset\ (FA)}$
  - $RFAR = \frac{Risky\ Financial\ Asset(RFA)}{Net\ Wealth\ (NW)}$
- Crowding Out Effect from *Jeonse*
  - $FAR_R - FAR_J$, $Alpha_R - Alpha_J$, $RFAR_R - RFAR_J$
- Crowding Out Effect from Homeowner
  - $FAR_R - FAR_P$, $Alpha_R - Alpha_P$, $RFAR_R - RFAR_P$

Second Stage: Crowding Out Effect Experiment

- True crowding out effect should be studied by imposing different housing tenures to otherwise identical households.

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- True crowding out effect should be studied by imposing different housing tenures to otherwise identical households.

- Model allows us to do that.

$\rightarrow$ $E(PF|\frac{X}{Y}, Age, Renter(\tau), Z) - E(PF|\frac{X}{Y}, Age, Homeowner(\Phi), Z)$

$\rightarrow$ $E(PF|\frac{X}{Y}, Age, Renter(\tau), Z) - E(PF|\frac{X}{Y}, Age, Jeonse(\Phi_J), Z)$

$\rightarrow$ $PF \in [FAR, Alpha, RFAR]$

Second Stage: Optimal Portfolio Choice over $x_a = X_a/Y_a$ at Age 50

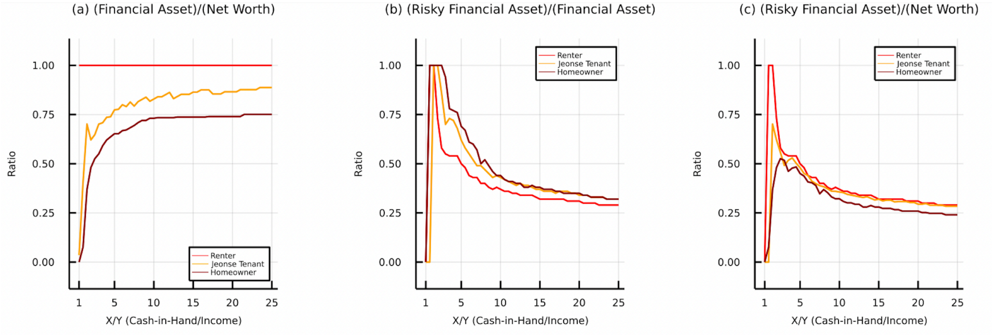


Fig4. Optimal Portfolio Choices (FAR/Alpha/RFAR)

High ρ_{hs} High γ

Second Stage: Crowding Out Effect over $x_a = X_a/Y_a$ at Age 50

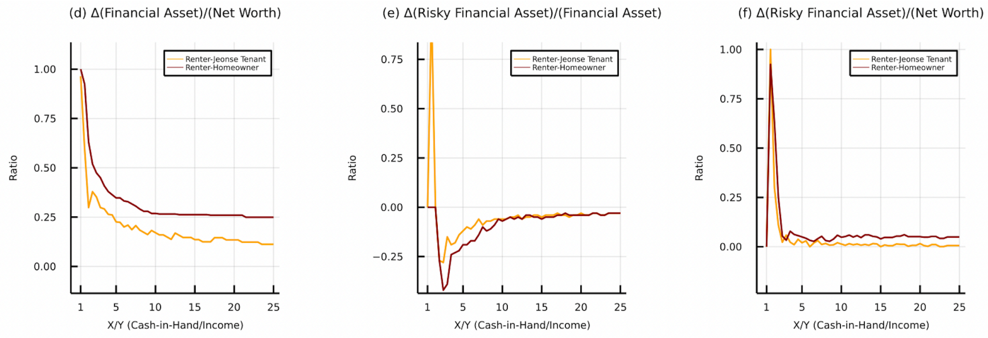


Fig5. Crowding Out Effect (FAR/Alpha/RFAR)

High ρ_{hs} High γ

Second Stage: Optimal Portfolio Choice over Ages at $x_a = 10$

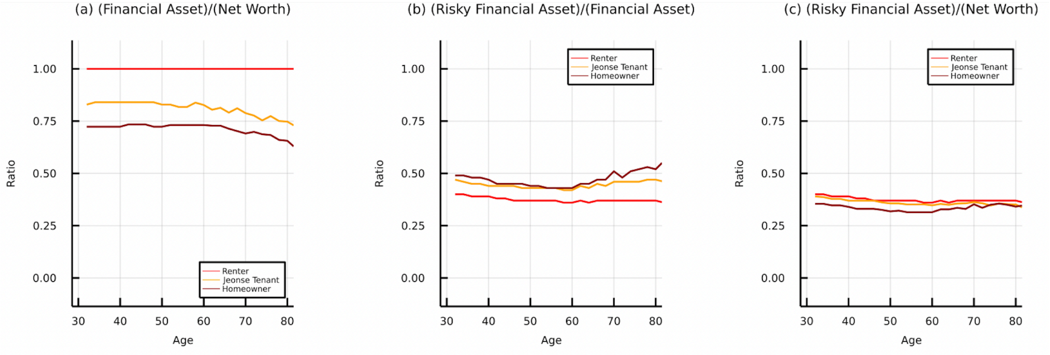


Fig5. Optimal Portfolio Choices (FAR/Alpha/RFAR)

▸▸ High ρ_{hs} ▸▸ High γ

Second Stage: Crowding Out Effect over Ages at $x_a = 10$

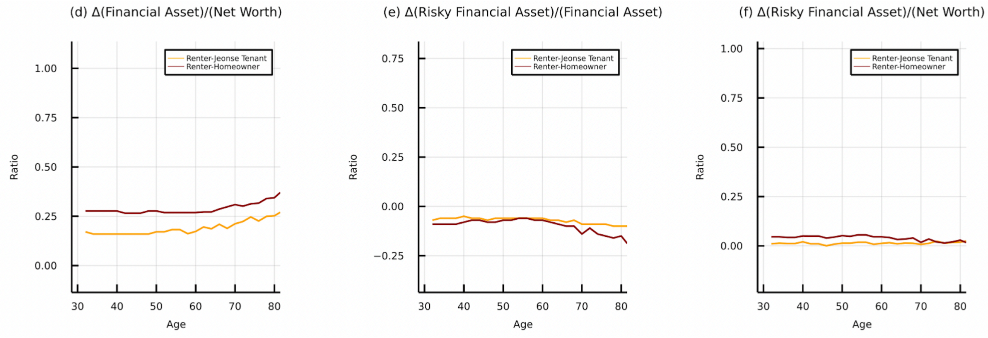


Fig6. Crowding Out Effect (FAR/Alpha/RFAR)

High ρ_{hs} High γ

Second Stage: *Jeonse* Crowding Out Effect over x_a and Ages

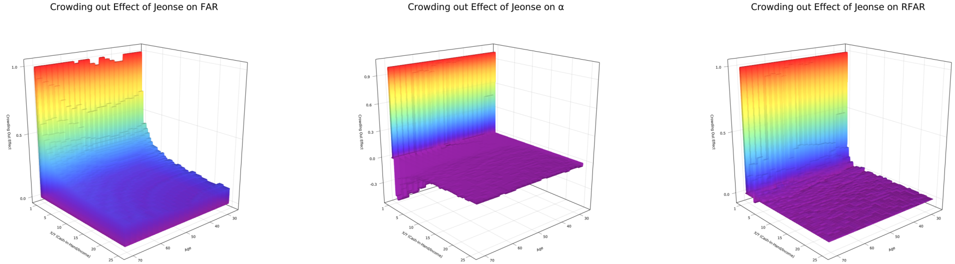


Fig7. Crowding out Effect of *Jeonse* Tenant

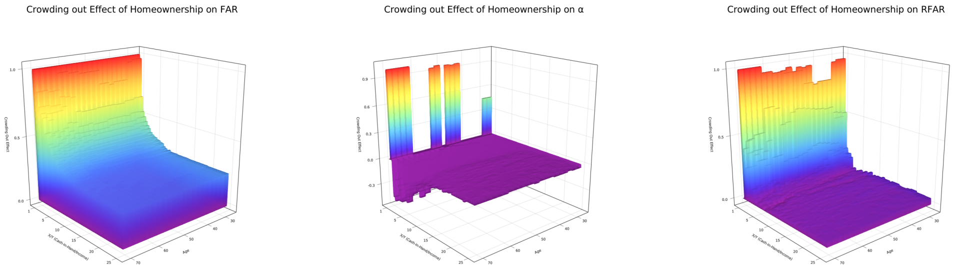


Fig8. Crowding out Effect of Homeowners

Empirical Analysis

Data Source

- Korean Labor and Income Panel Study (KLIPS)
  - Annual panel survey starting from 1998
  - Tracking about 5000(98), 6721(09), 12134(18) households representing the entire Korean population
  - It has a detailed data on non-durable goods expenditures, housing expenditures, income, wealth, debt, asset allocation, human capital, and household characteristics.

Definitions of Variables

- **Financial Assets (*FA*)**: Bank deposits, Mutual Funds, Stocks, Bonds, Saving Insurances.

$\rightarrow$ **Risky Financial Assets (*RFA*)**: Mutual Funds, Stocks, Bonds.

- **Real Assets (*RA*)**: Real Estates including the House of Living , Cars, Lands, Any Other Types of Real Assets.
- **Liabilities (*LB*)**: Any Types of Borrowing from Banks (including Mortgage), Private Borrowings.
- **Net Wealth (*W*)** = $FA + RA - LB$
- **Non-capital Income (*Y*)**: Labor Incomes, Pensions, Social Insurances, and Family Transfer Incomes

Definitions of Variables

- Financial Asset Ratio (FAR) = FA/W
- Risky Financial Asset Ratio over Financial Asset ($Alpha$) = RFA/FA
- Risky Financial Asset Ratio ($RFAR$) = RFA/W
- SMP = $1[Risky\ Financial\ Asset > 0]$.

- **Sample Selection**
  - Year: 2009 $\sim$ 2019
  - Households who replied more than 4 times
  - Households with positive net worth W
  - Households with Y larger than $1,057.45
  - Removed top 1 percent and bottom 1 percent of households in terms of $(\frac{W}{Y})$
  - Removed *Jeonse* tenants and renters who have other housing assets twice larger than their *Jeonse* deposit or rent deposit

Summary Statistics

	Renters	*Jeonse* Tenants	Homeowner
Fraction of households	0.129	0.228	0.584
Age	45.93	43.59	54.66
Net Wealth (*W*)	3455.43	13066.38	28364.04
Real Assets (*RA*)	1903.60	5129.64	29411.29
Financial Assets (*FA*)	828.52	2143.89	2922.23
Risky Financial Asset (*RFA*)	137.43	354.83	364.80
Liabilities (*LB*)	987.38	2816.77	4381.23
Non-capital Income (*Y*)	3083.27	4303.13	4512.95
Financial Asset Ratio (*FAR*)	0.2962	0.1897	0.1003
Risky Financial Asset Ratio (*RFAR*)	0.0087	0.0154	0.0096
Risky Financial Asset Ratio over Financial Assets (*Alpha*)	0.0181	0.0595	0.0444
Conditional Risky Financial Asset Ratio ($c-RFAR$)	0.2688	0.1207	0.1083
Conditional Risky Financial Asset Ratio over Financial Assets ($c-Alpha$)	0.5549	0.4654	0.4960
Stock Market Participation (*SMP*)	0.0326	0.1279	0.0894
Net Wealth over Income Ratio ($\frac{W}{Y}$)	1.4705	5.8382	16.8268
House Price	0	0	23483.21
Jeonse Deposit	0	8310.23	0
Rent Deposit	1538.40	0	0

Table3. Summary Statistics [2]

[2] 1 means 10,000 Korean won which corresponds to $8.81 in 2010. I use only 2010 survey to show the data pattern.

Relationship Between Housing Tenures and Portfolio Choices

$$PF_{it} = \beta_J Jeonse_{it} + \beta_O Owner_{it} + Region_i + Time_t + \epsilon_{it}$$

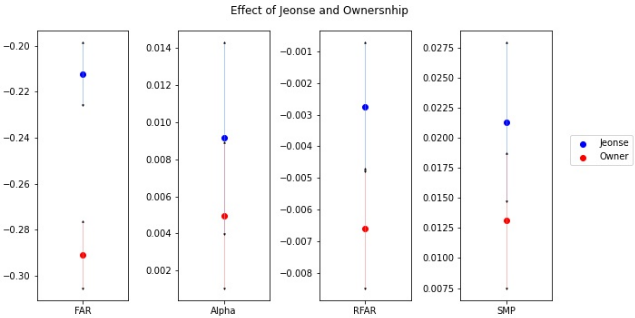


Fig 9. Estimated β_J and β_O

- **Main Points**

1. How do *Jeonse* and homeownership affect the portfolio choice variables $FAR, Alpha, RFAR$?
2. Is the crowding-out effect from homeownership larger than that from *Jeonse*?
3. Do households with high X/Y or older age show smaller crowding-out effect from *Jeonse* while showing persistent the crowding-out effect from homeownership?
4. What will be the roles of ρ_{hs}, γ?

Econometric Specification - W/Y

The Crowding-out effect of *Jeonse* and Homeownership Across W/Y.

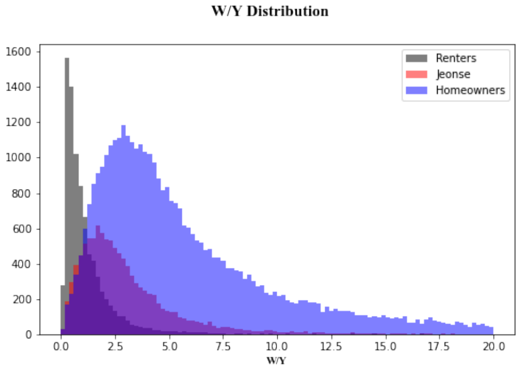
$$PF_{it} = \beta U_{it} + \sum_{Q=1}^{8} \gamma_{1Q} Jeonse_{it}[\frac{W}{Y}]_{it}^{Q} + \sum_{Q=1}^{8} \sigma_{1Q} Owner_{it}[\frac{W}{Y}]_{it}^{Q} + \epsilon_{it}$$

$$PF_{it} \in (FAR_{it}, RFAR_{it}, Alpha_{it})$$

- Control variables (U_{it})
  - Year Fixed Effect and Household Fixed Effect
  - $\frac{W}{Y}$, Age
  - Education Level, Number of Members in the Household
- Endogeneity Concern

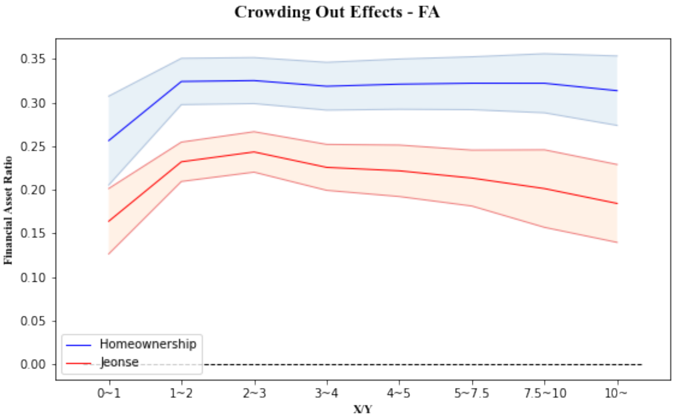
Groups

: 0-1/1-2/2-3/3-4/4-5/5-7.5/7.5-10/10-



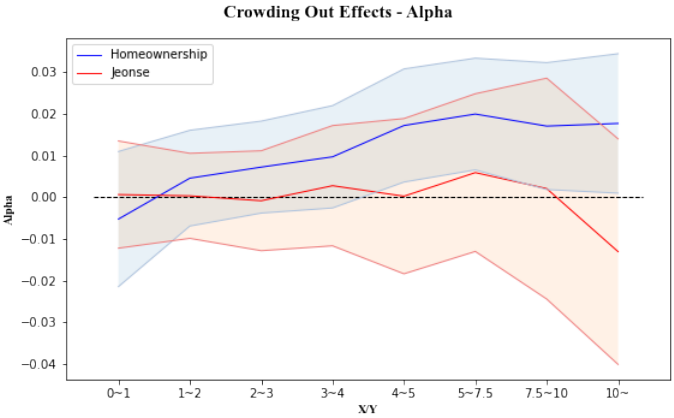
W/Y Distribution

Estimated γ_Q, σ_Q on *FAR*



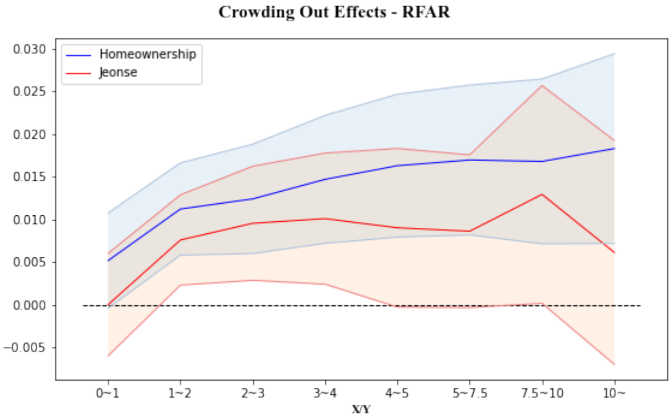
Financial Asset Ratio (*FAR*) = FA/W

Estimated γ_Q, σ_Q on *Alpha*



Risky Financial Asset Ratio over Financial Asset (*Alpha*) = RFA/FA

Estimated γ_Q, σ_Q on $RFAR$



Risky Financial Asset Ratio ($RFAR$) = RFA/W

Econometric Specification - *Age*

The Crowding-out effect of *Jeonse* and Homeownership Across *Age*.

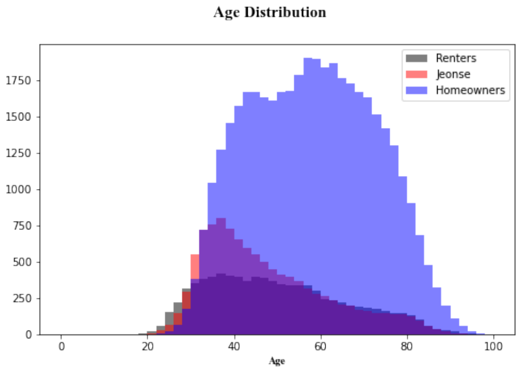
$$PF_{it} = \beta U_{it} + \sum_{Q=1}^{5} \gamma_{1Q} Jeonse_{it}[Age]_{it}^{Q} + \sum_{Q=1}^{5} \sigma_{1Q} Owner_{it}[Age]_{it}^{Q} + \epsilon_{it}$$

$$PF_{it} \in (FAR_{it}, RFAR_{it}, Alpha_{it})$$

- Control variables (U_{it})
  - Year Fixed Effect and Household Fixed Effect
  - $\frac{W}{Y}$, *Age*
  - Education Level, Number of Members in the Household
- Endogeneity concerns

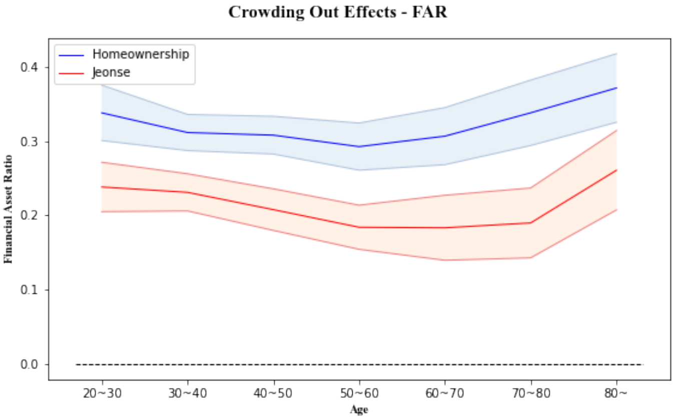
Groups

: 0-35/35-50/50-65/65-80/80-



Age Distribution

Estimated γ_Q, σ_Q on FAR



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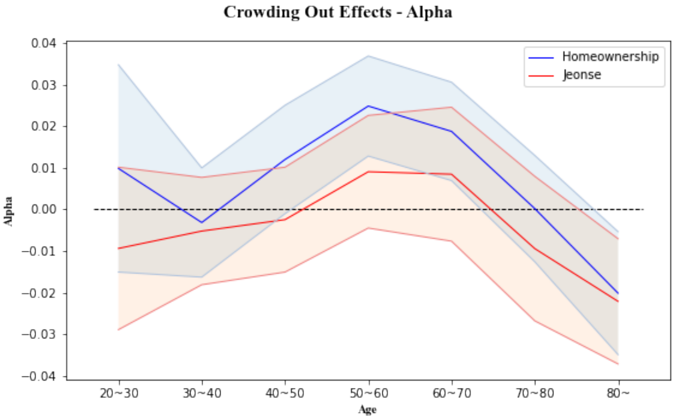

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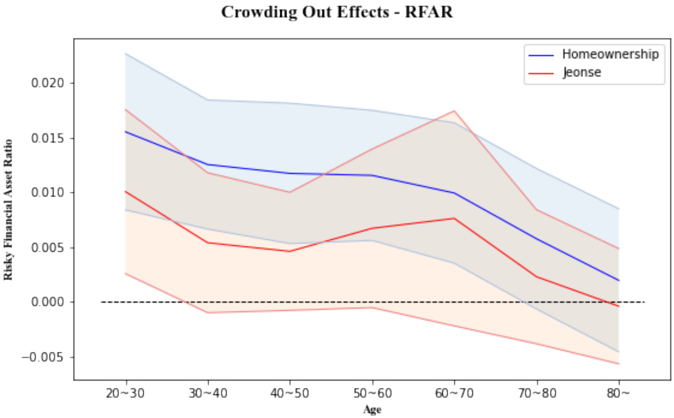

Risky Financial Asset Ratio ($RFAR$) = RFA/W

Conclusion

Conclusion and Future Plan

- **Conclusion**

→ Exploiting unique contract structure of housing tenure called *Jeonse*, I aim to study two potential channels of the crowding out effect.

1. Liquidity constraint does exist as a separate channel, and households with high net wealth-to-income ratio or old households seem not affected by it.
2. House price risk channel sustains though households have high net wealth-to-income ratio.

- **Future Plan**

→ Model estimation and simulation & Policy Experiments

Appendix

Liquidity Constraint Channel from *Jeonse*

- Korean Housing Market
  - Average *Jeonse* deposit ratio: 0.645
  - Downpayment for *Jeonse* Mortgage: 0.416
  - Downpayment for Homepurchase Mortgage: 0.482

Liquidity Constraint Channel from *Jeonse*

- **Korean Housing Market**
  - Average *Jeonse* deposit ratio: 0.645
  - Downpayment for *Jeonse* Mortgage: 0.416
  - Downpayment for Homepurchase Mortgage: 0.482
- **If house is valued at $100,**
  - *Jeonse* requires $26.7
  - *Housing Purchase* requires $48.2

Return

Why Do Tenants Use *Jeonse* vs Rent? - Example (House of $100,000)

- **Rent** for 2 years
  - Tenant $\rightarrow \tau P_H H \rightarrow$ Landlord

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- **Jeonse** Contract for 2 years
  - Tenant $\rightarrow \phi_J \bar{J} P_a^H H + (1 - \delta_J)\bar{J} P_a^H H(R_M - 1) + \delta_J \bar{J} P_a^H H(R_f - 1) \rightarrow$ Landlord&Etc

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1. Contract Fee: $\phi_J \bar{J} P_a^H H = \$193.5$

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1. Contract Fee: $\phi_J \bar{J} P_a^H H = \$193.5$
2. Mortgage Interest: $(1-\delta_J)\bar{J} P_a^H H(R_M - 1) = \$3,624.0$

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2. Mortgage Interest: $(1-\delta_J)\bar{J} P_a^H H(R_M - 1) = \$3,624.0$
3. Opportunity Cost: $\delta_J \bar{J} P_a^H H(R_f - 1) = \$1,248.46$

Why Do Tenants Use *Jeonse* vs Rent? - Example (House of $100,000)

- **Rent** for 2 years

 - Tenant $\rightarrow \tau P_H H \rightarrow$ Landlord

 - Rent: $\tau P_H H = 0.035 \times 2 \times \$100,000 = \$7,000$

$\rightarrow$ Total $= \$7,000$.

- **Jeonse** Contract for 2 years

 - Tenant $\rightarrow \phi_J \bar{J} P_a^H H + (1-\delta_J)\bar{J} P_a^H H(R_M - 1) + \delta_J \bar{J} P_a^H H(R_f - 1) \rightarrow$ Landlord&Etc

1. Contract Fee: $\phi_J \bar{J} P_a^H H = \$193.5$
2. Mortgage Interest: $(1-\delta_J)\bar{J} P_a^H H(R_M - 1) = \$3,624.0$
3. Opportunity Cost: $\delta_J \bar{J} P_a^H H(R_f - 1) = \$1,248.46$

$\rightarrow$ Total $= \$5,065.96$.

Jeonse is cheaper than Rent as long as HH can pay the downpayment $(= \$26,832)$.

Why Do Tenants Use *Jeonse* vs Purchase - Example (House of $100,000)

- *Jeonse*
  - Downpayment: $26,832
  - Mortgage Interest: $253

Why Do Tenants Use *Jeonse* vs Purchase - Example (House of $100,000)

- *Jeonse*
  - Downpayment: $26,832
  - Mortgage Interest: $253
- Purchase
  - Downpayment: $48,200
  - Mortgage Interest: $392

Why Do Tenants Use *Jeonse* vs Purchase - Example (House of $100,000)

- ***Jeonse***
  - Downpayment: $26,832
  - Mortgage Interest: $253
- **Purchase**
  - Downpayment: $48,200
  - Mortgage Interest: $392

With *Jeonse*, HH can live in a same quality of housing in a cheaper way, but they cannot get the capital gain/loss from potential housing price increase.

Why Do Landlords Use *Jeonse* vs Rent? - Example (House of $100,000)

- **Rent**

- Receive $7,000 rent

Why Do Landlords Use *Jeonse* vs Rent? - Example (House of $100,000)

- **Rent**

  - Receive $7,000 rent

- *Jeonse* Contract

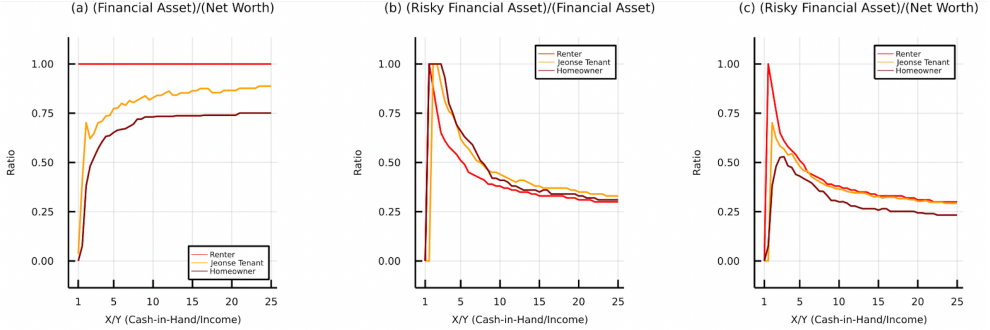
  - Able to use $64,500 for 2 years freely

Why Do Landlords Use *Jeonse* vs Rent? - Example (House of $100,000)

- **Rent**
  - Receive $7,000 rent
- ***Jeonse*** Contract
  - Able to use $64,500 for 2 years freely

Depending on the investment opportunity set or liquidity condition, either Rent or *Jeonse* can be better to the landlord Return

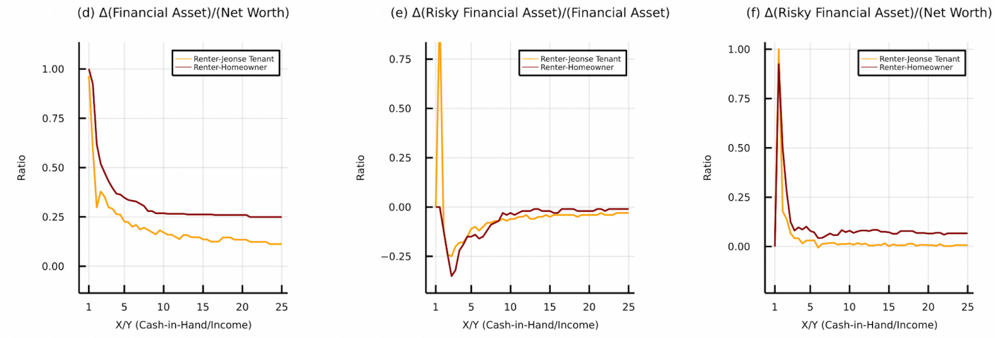
HC ($\rho = 0.3$) - Optimal Portfolio Choice over $x_a = X_a/Y_a$ at Age 50



FigA. Optimal Portfolio Choices (FAR/Alpha/RFAR)

Return

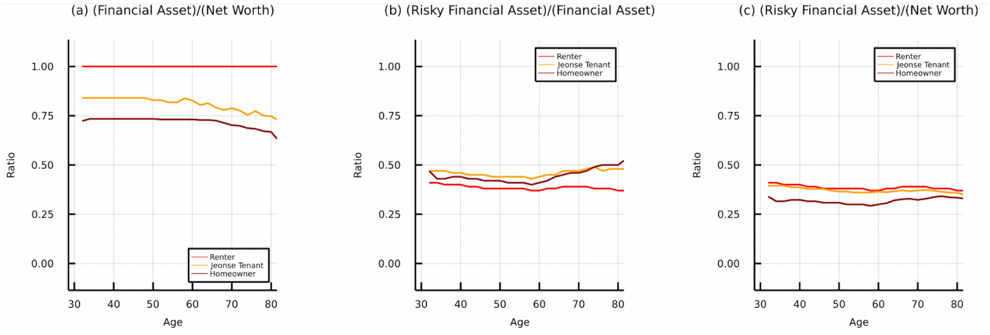
HC ($\rho = 0.3$) - Crowding Out Effect over $x_a = X_a/Y_a$ at Age 50



FigA. Crowding Out Effect (FAR/Alpha/RFAR)

▸▸ Return

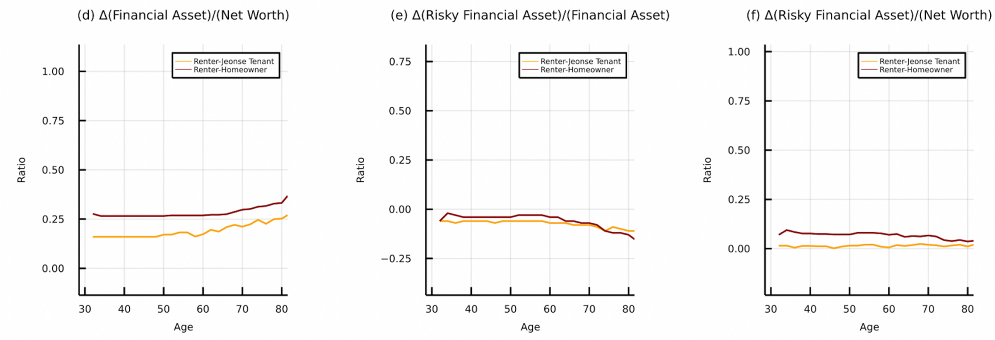
HC ($\rho = 0.3$) - Optimal Portfolio Choice over Ages at $x_a = 10$



FigA. Optimal Portfolio Choices (FAR/Alpha/RFAR)

Return

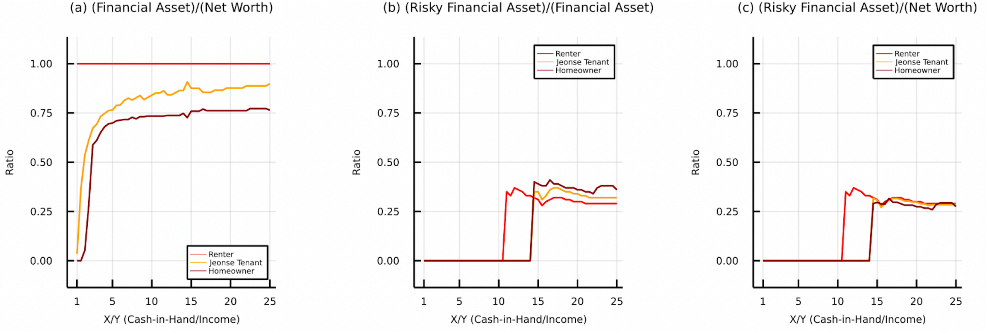
HC ($\rho = 0.3$) - Crowding Out Effect over Ages at $x_a = 10$



FigA. Crowding Out Effect (FAR/Alpha/RFAR)

Return

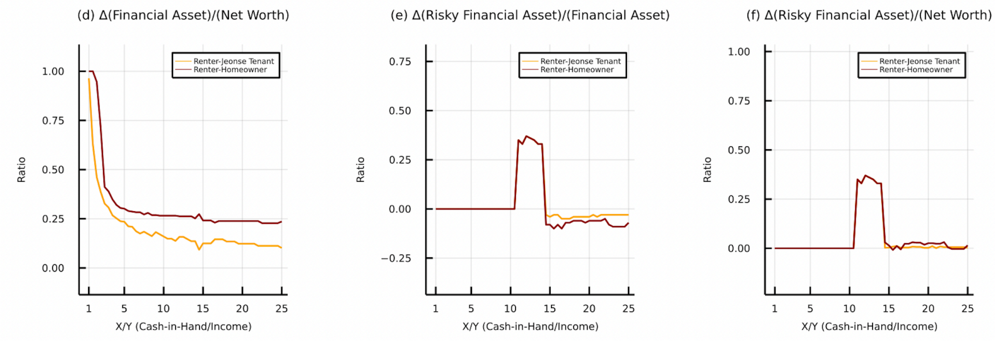
HSMP ($\gamma = 0.05$) - Optimal Portfolio Choice over $x_a = X_a/Y_a$ at Age 50



FigA. Optimal Portfolio Choices (FAR/Alpha/RFAR)

Return

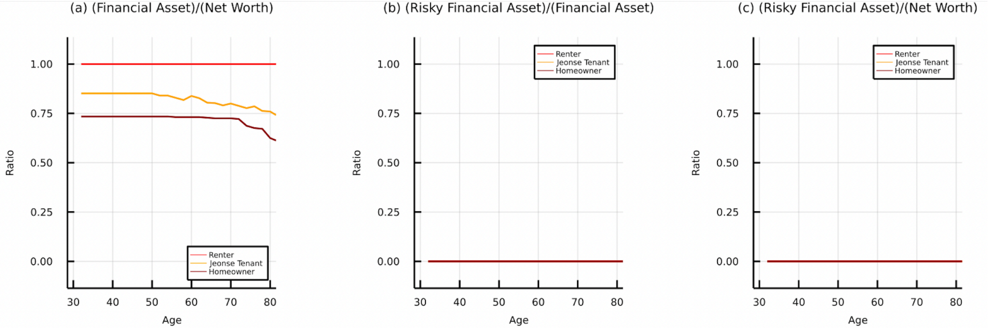
HSMP ($\gamma = 0.05$) - Crowding Out Effect over $x_a = X_a / Y_a$ at Age 50



FigA. Crowding Out Effect (FAR/Alpha/RFAR)

⏩ Return

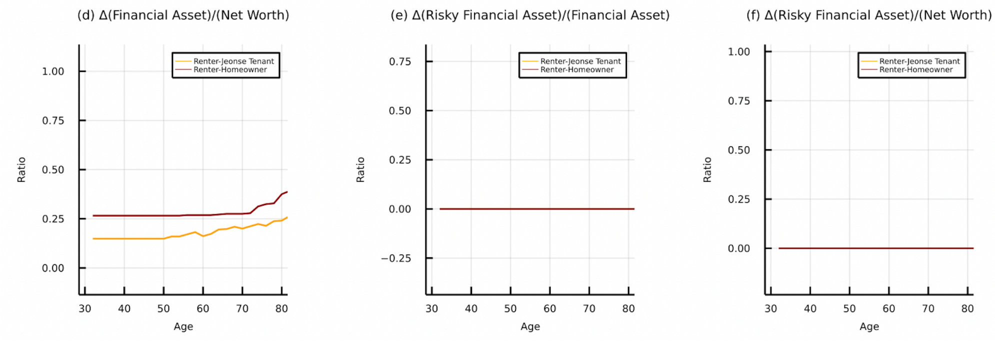
HSMP ($\gamma = 0.05$) - Optimal Portfolio Choice over Ages at $x_a = 10$



FigA. Optimal Portfolio Choices (FAR/Alpha/RFAR)

▶▶ Return

HSMP ($\gamma = 0.05$) - Crowding Out Effect over Ages at $x_a = 10$



FigA. Crowding Out Effect (FAR/Alpha/RFAR)

Return

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