The Gender Gap in Housing Returns

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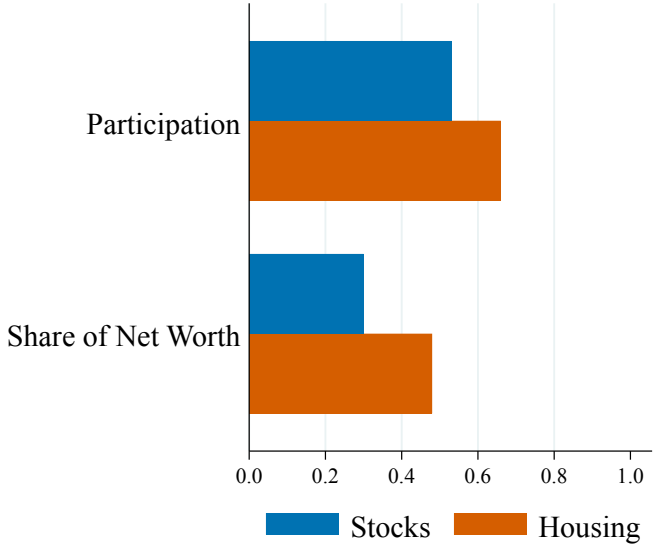
Housing wealth is the dominant form of savings for US households

- Housing is ...
  - Illiquid
  - Heterogeneous
  - Priced through bilateral negotiation
- Research showing gender differences in ...
  - Financial sophistication
  - Preferences for e.g. risk, competition, and agreeability
  - Negotiation
- Do men and women differ in their financial returns on housing?



Source: Survey of Consumer Finances

Data on 53M US housing transactions reveals ...

1. Women earn 1 pp lower annualized unlevered returns than men
   - Gender gap in returns increases to 5.7 pp after accounting for leverage
   - Couples also earn lower returns, but outperform women after adjusting for timing

2. Using repeat sales, women buy for 2% more and sell for 2% less
   - Prices and discounts vary with the gender match between buyers and sellers

3. Sources of the gender gap
   - Location and timing of transactions
   - Choice of list price
   - Negotiated discount relative to the list price

4. Gender differences in property risk, maintenance investment, and preferences over housing characteristics appear to be less important factors

Implications

Complements research on gender differences in stock market participation / performance

- Important to study housing, which is a larger proportion of savings
- Personal preferences and negotiation matter less for stock market returns

Complements literature on gender differences in negotiation in labor and auto markets

- Housing is likely to be the largest negotiated purchase
- Unlike labor market negotiations, little risk of future interaction
- However, we don't seek to disentangle negotiation ability from preferences
  - Women may derive greater utility from getting a particular house or having a fast or non-confrontational negotiation process

Differences in housing returns are large and contribute to the gender gap in wealth

Limited existing evidence on gender and housing

Harding et al. (2003)

- Data from the American Housing Survey
- Structural estimation of how bargaining power varies with demographics

Andersen et al. (2018)

- Also focused on bargaining power and negotiation
- Insignificant gender gap in transaction prices for repeat sales ***in Denmark***

We care about the gender gap in total housing returns, including non-bargaining channels

- Show women earn lower return due to market timing, selection of listing price
- First to use listing prices to isolate the negotiated discount
- Large US gender gap relative to Denmark suggests culture and environment matter

Measurement and data

Data

Corelogic county deed records (53M obs)

- Restrict to arms-length transactions, exclude refinancings
- Sale price, property address, names on both sides of transaction
- Most US states, 1991-2017

Linked to MLS property listings (20M obs)

- Listing date, list price, close date, sale price, listing agent
- Property features, e.g. number bedrooms, upgrades, age of house

Supplement with data from Census and American Housing Survey

- Demographics

Identification of gender and relationships

Deed records contain full names of buyers and sellers

- Identify number of parties on each side of the transaction
- Measure probability that first name is male or female
  - Following Chari and Goldsmith-Pinkham 2019; Tang et al. 2011
- Assign gender for names with probability $\geq$ 95%, else treat as unidentified gender

Categorization

- Single female: one person, identified female
- Single male: one person, identified male
- Couple: two people with identified gender
- Other: everybody else (including unidentified gender and institutions)

Measuring unlevered housing returns

Property i bought in year b for P_{ib} and sold in year s for P_{is}

- Restrict to identified female, male, and couples
- Name, gender, and family structure of buyer in b must match seller in s
- Restrict to holding length $>$ 3 months
- 9.4M obs after these filters

Annualized unlevered return

$$r_{is} = \left(\frac{P_{is} - P_{ib}}{P_{ib}} \right)^{\frac{1}{(s-b)}} - 1$$

Measuring levered returns

Real return on housing is typically a levered return

- Majority of US homeowners buy homes using debt, with LTV $\geq 80\%$
- Initial leverage persists because amortization schedules mainly pay interest upfront

Downpayment D_{ib} and principal paydowns $\{W_{i\tau}\}_{\tau=b}^{s}$

NPV of equity in year b : $\text{Equity}_{ib} \approx D_{ib} + \sum_{\tau=b}^{s} W_{i\tau} / (1+\rho_{ib})^{\tau-b}$

- ρ_{ib} is interest on a 30-year fixed mortgage

Equity in year s : $\text{Equity}_{is} = \max\{0, P_{is} - \text{Mortgage}_{is}\}$

Annualized levered return :

$$r_{is}^{\text{lev}} = \left(\frac{\text{Equity}_{is} - \text{Equity}_{ib}}{\text{Equity}_{ib}} \right)^{\frac{1}{(s-b)}} - 1$$

Baseline empirical results

Estimation approach

Baseline return regression

$$r_{is} = \text{Female}_{is}\beta_1 + \text{Couple}_{is}\beta_2 + X_{is}\tau + \epsilon_{is}$$

- β_1 and β_2 capture difference in returns compared to Male_{is}
- X_{is} are controls such as five-digit zipcode $\times$ sale-year-month FE
- Standard errors clustered by zipcode

Examine other outcomes such as transaction price

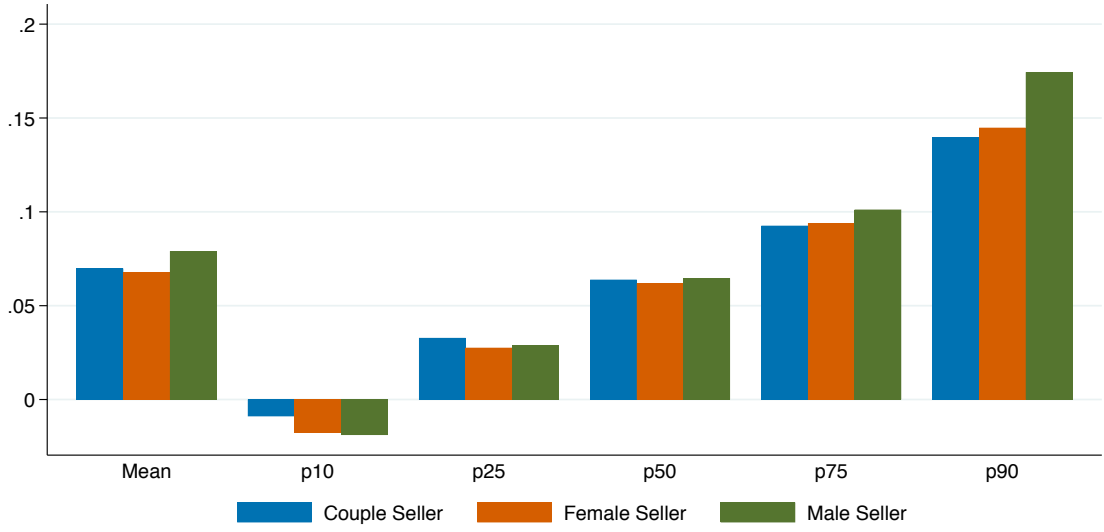
$$Y_{it} = \text{Female}_{it}\beta_1 + \text{Couple}_{it}\beta_2 + \text{Other}_{it}\beta_3 + X_{it}\tau + \epsilon_{it}$$

- Exploit repeat sales: X_{it} includes property FE
- Include other transactions outside the returns sample to better estimate property FE

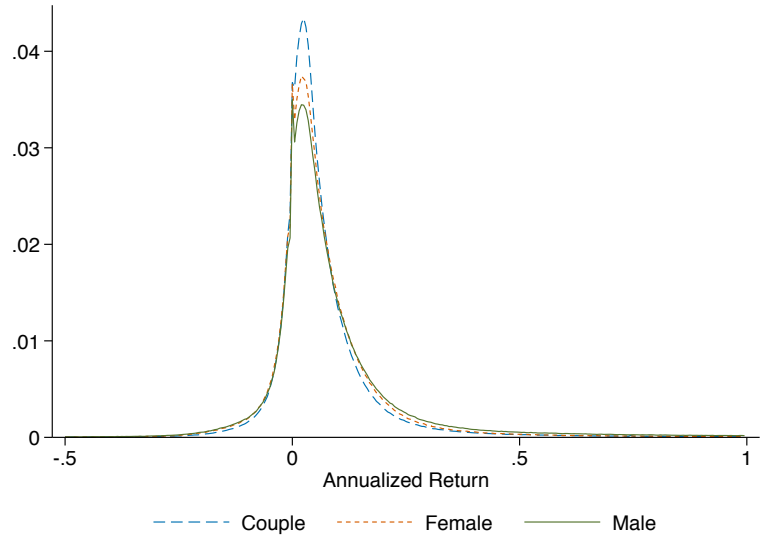
Housing returns: unlevered

	Unlevered Ann Return		
	(1)	(2)	(3)
Single Female	-0.016***	-0.013***	-0.011***
	(0.000)	(0.000)	(0.000)
Couple	-0.020***	-0.012***	-0.007***
	(0.000)	(0.000)	(0.000)
Holding Length			-0.006***
			(0.000)
Zip-Year-Month FE	No	Yes	Yes
R-squared	0.005	0.354	0.379
Observations	9,351,419	9,351,419	9,351,419

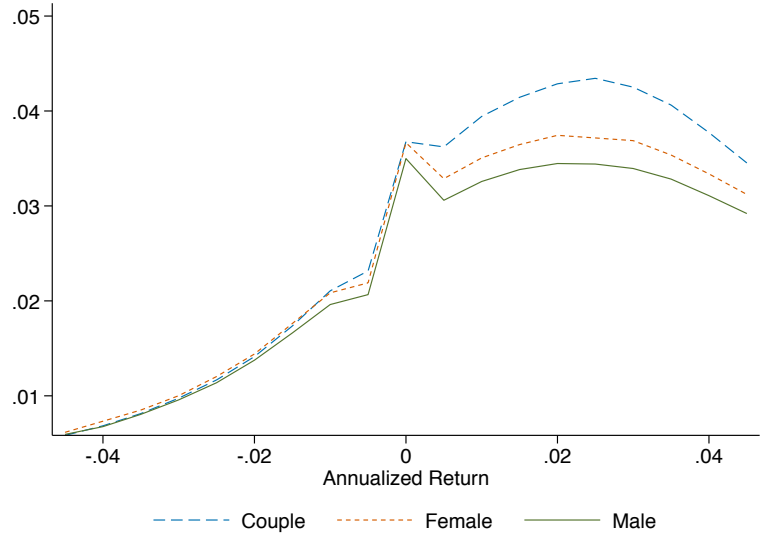
Annualized unlevered returns by gender



Density of unlevered returns by gender

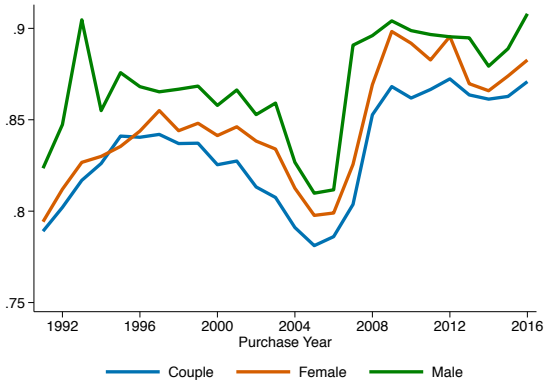


Suggestive evidence of the disposition effect

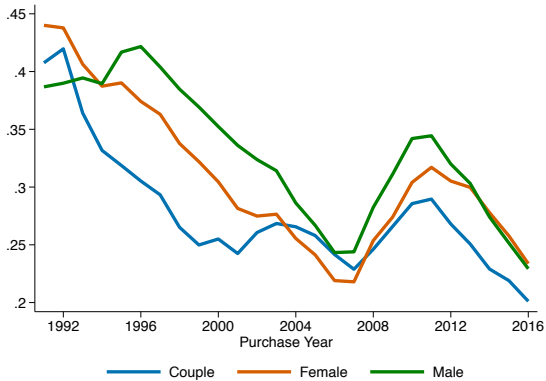


Real return is likely to be levered return

LTV conditional on mortgage



Fraction missing mortgage data



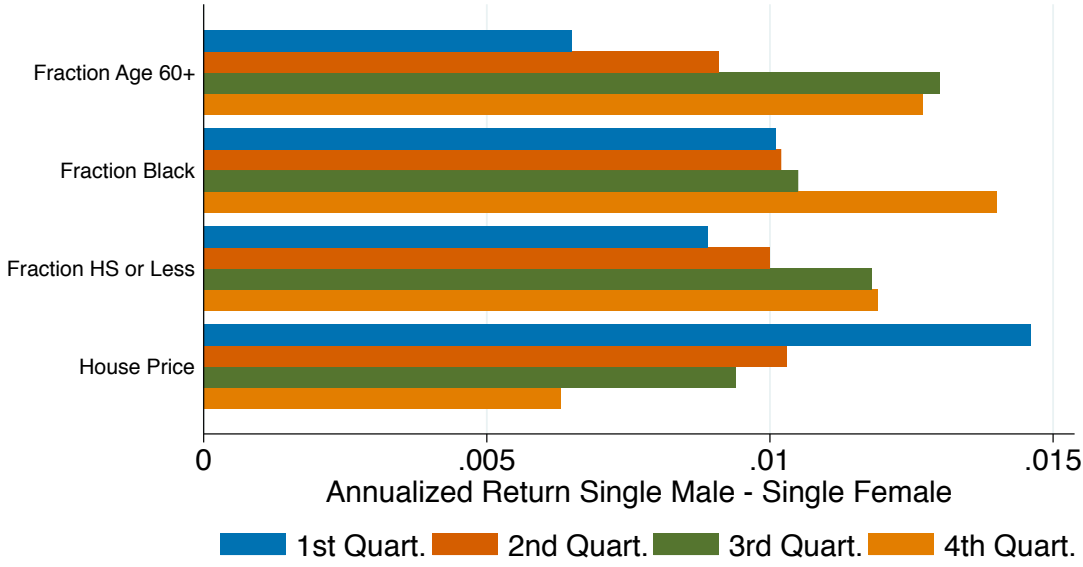
Housing returns: levered

	Lev Ann Ret (missing=0%)	Lev Ann Ret (missing=80%)	Lev Ann Ret (LTV=80%)
	(1)	(2)	(3)
Single Female	-0.033***	-0.056***	-0.057***
	(0.001)	(0.001)	(0.001)
Couple	-0.032***	-0.055***	-0.043***
	(0.001)	(0.001)	(0.001)
Holding Length	-0.035***	-0.047***	-0.037***
	(0.000)	(0.000)	(0.000)
Zip-Year-Month FE	Yes	Yes	Yes
R-squared	0.349	0.346	0.330
Observations	9,351,419	9,351,419	9,351,419

Annualized levered returns by gender - LTV of 80

Heterogeneity and timing

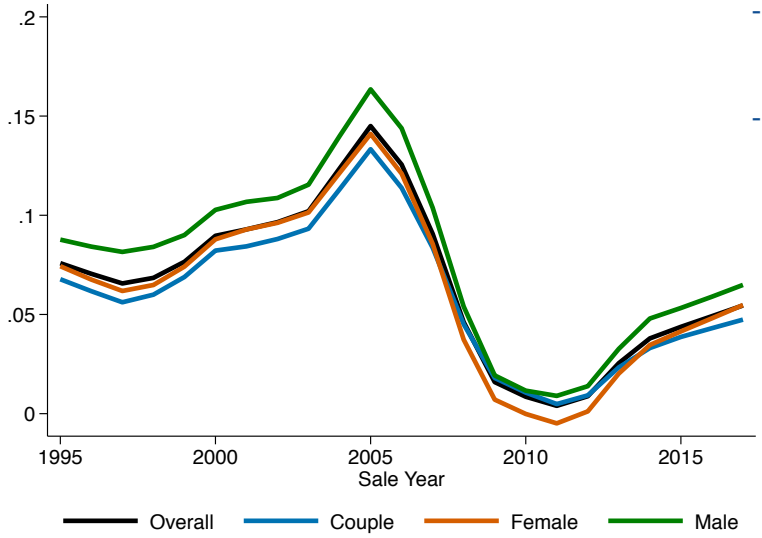
Gender gap by zip-level demographics: quartile averages



Gender gap by zip-level demographics: regressions

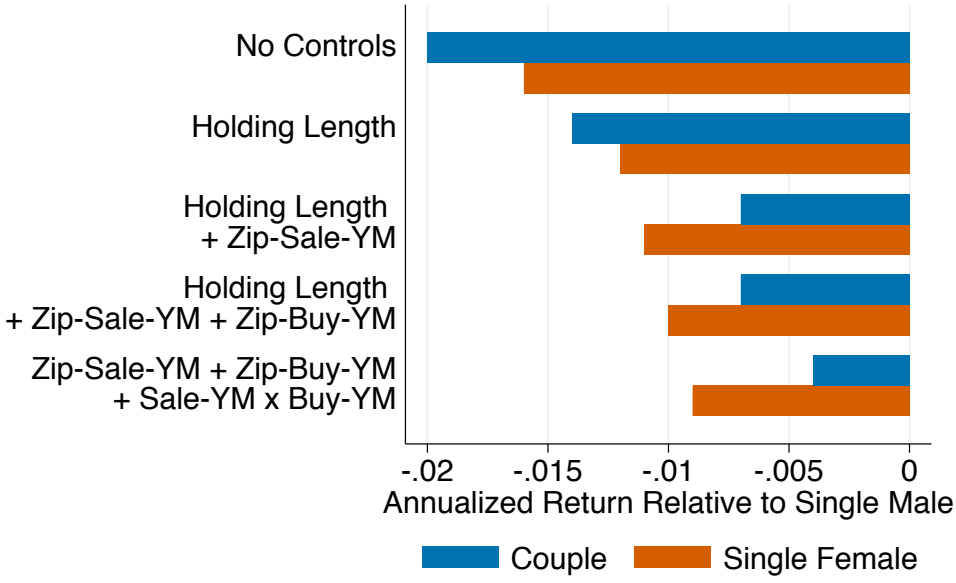
	Male - Female Unlevered Ann Return	Male - Female Levered Ann Return
	(1)	(2)
Frac Black	0.004	0.019
	(0.006)	(0.028)
Frac HS education or less	0.024***	0.089**
	(0.009)	(0.043)
Frac 60+	0.025***	0.133***
	(0.009)	(0.047)
Frac Single Female	0.038***	0.188***
	(0.012)	(0.057)
Log Median Family Income	0.011***	0.052***
	(0.003)	(0.014)
R-squared	0.003	0.003
Observations	14,310	14,310

Unlevered annualized returns over time



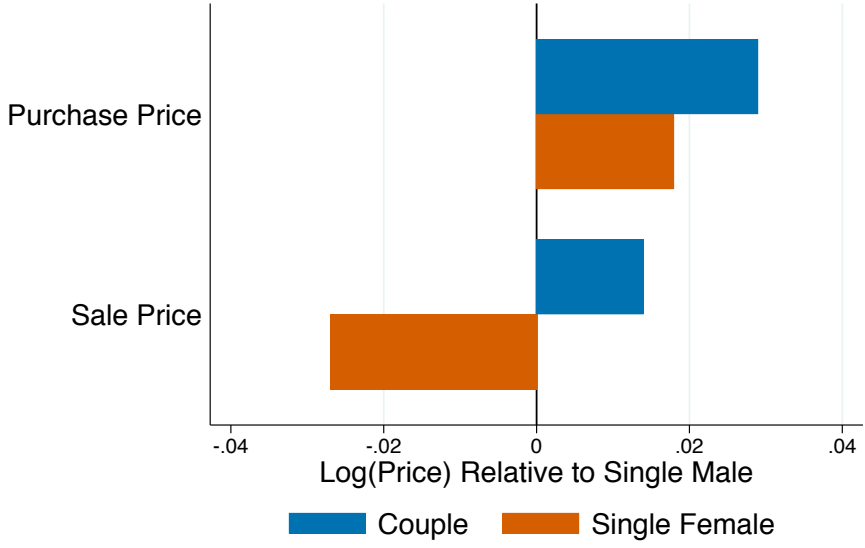
- Mean return by *sale* year varies with the business cycle
- Large gender gap even in recent years

Unlevered returns: market timing

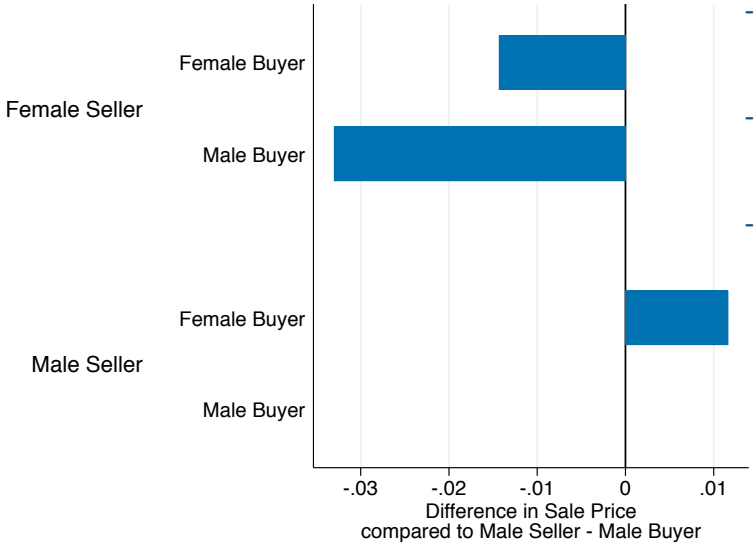


Gender gap in execution prices

Transaction price

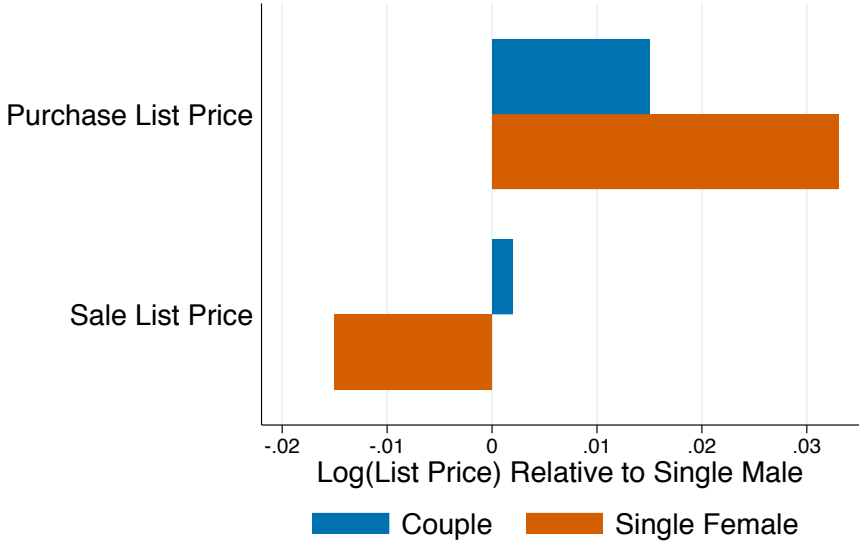


Transaction price by buyer-seller gender

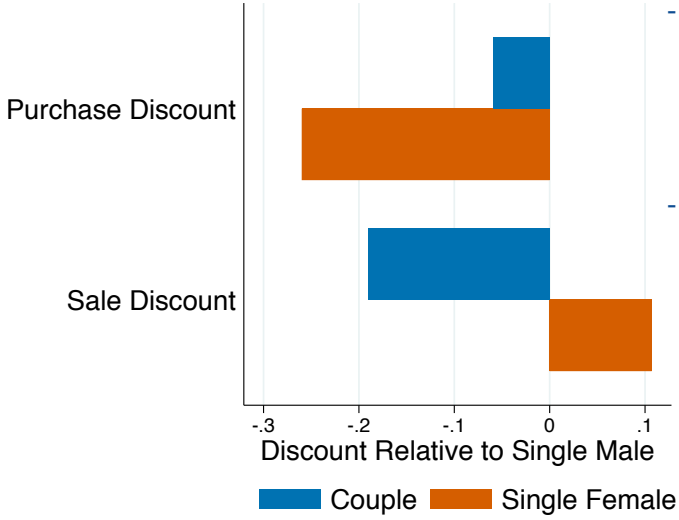


- Base group:
  male buyer - male seller
- Female sellers sell for less
  $\rightarrow$ More so to men
- Male sellers sell for more
  $\rightarrow$ More so to women

List price


Purchase List Price
Sale List Price
-.02
-.01
0
.01
.02
.03
Log(List Price) Relative to Single Male
Couple
Single Female

Discount relative to listing price

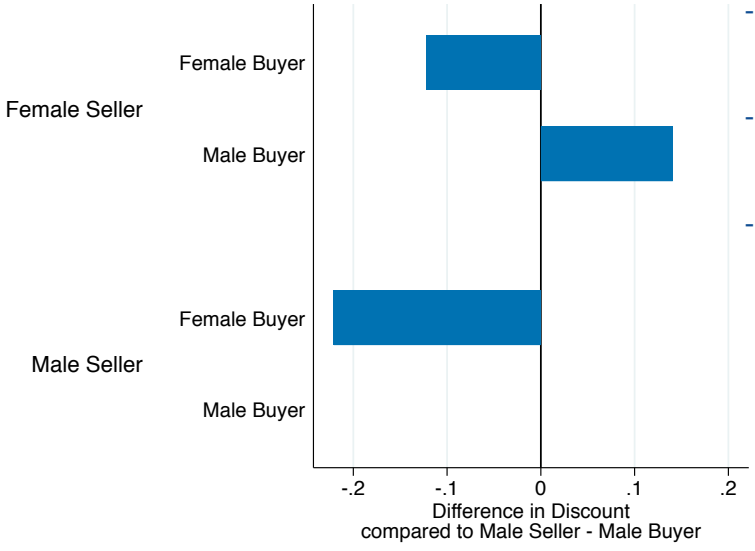


- Discount $=$

$$\frac{(\text{list price} - \text{transaction price})}{\text{list price}} \times 100$$

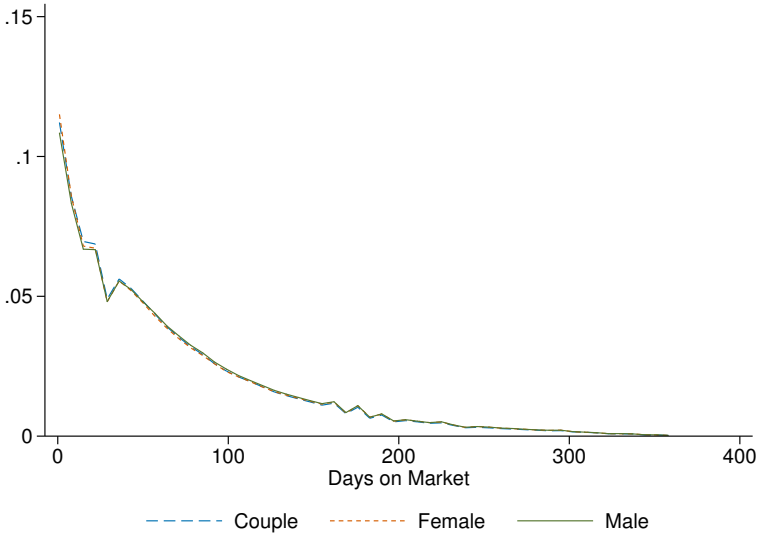
- Larger discount benefits the buyer and hurts the seller

Discount by buyer-seller gender



- Base group:
  male buyer - male seller
- Female sellers give
  larger discount to men
- Male sellers give
  smaller discount to women

Distribution of sale days on market



- Female sellers list lower and offer bigger discounts
- Sell approximately 3% faster

Other potential channels

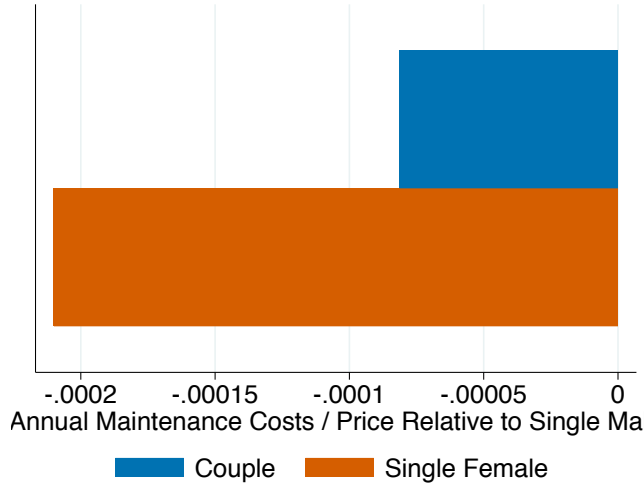
Other potential channels

1. **Men buy riskier homes or homes with characteristics associated with higher returns**
   → Listings data: controlling for property characteristics does not affect gap
2. **Men invest more in upgrades or maintenance**
   → Listings data: similar gap for homes that have not been upgraded
   → American Housing Survey: no gap in maintenance *amounts*
3. **Women may be older, have more children, be less educated, etc.**
   → American Housing Survey: Similar gender gap after controlling for demographics
   → Having children predicts lower returns, but being female $\approx$ 3 children

(1) and (2) are also inconsistent with variation by holding length and market tightness ...

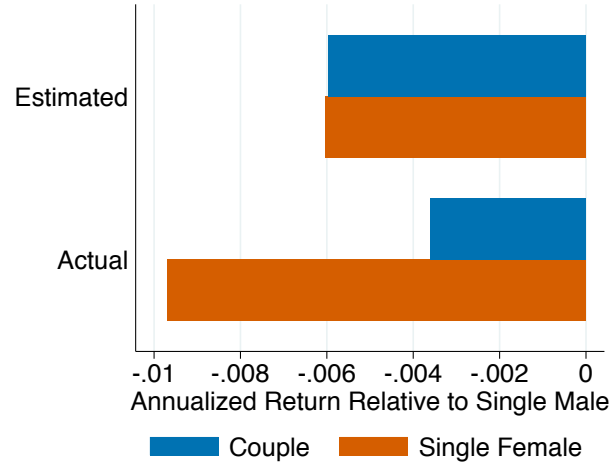
American Housing Survey

1. Women do not invest less in maintenance



American Housing Survey

1. Women do not invest less in maintenance
2. Gender gap is smaller using self-reported estimated current value
3. Large gender gap in returns even after controlling for demographics



Source: American Housing Survey

American Housing Survey

1. Women do not invest less in maintenance
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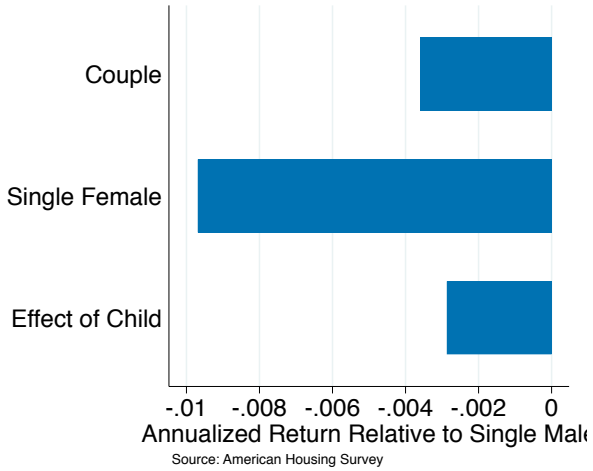


Execution prices and holding length

So far, we've shown that women buy the same property for $\approx$ 2% more and sell for 2% less

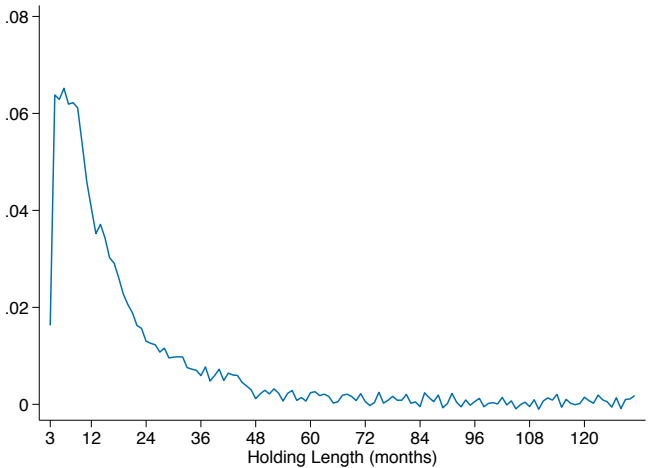
- Equivalent to women getting worse ***execution prices*** on real estate investment
- Differences in execution prices matter less for returns of "long term" investors

Simple framework

- Let δ be the female fractional disadvantage in execution prices
- Let γ be the gender gap in returns due to men investing more in maintenance or preferring properties with naturally higher returns

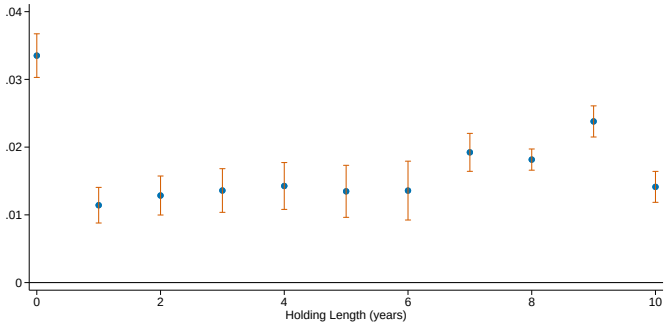
$$r^{\text{female}}(t) \approx r^{\text{male}}(t) - \left(\frac{2\delta}{t} + \gamma\right)$$

Gender gap in unlevered returns by holding period



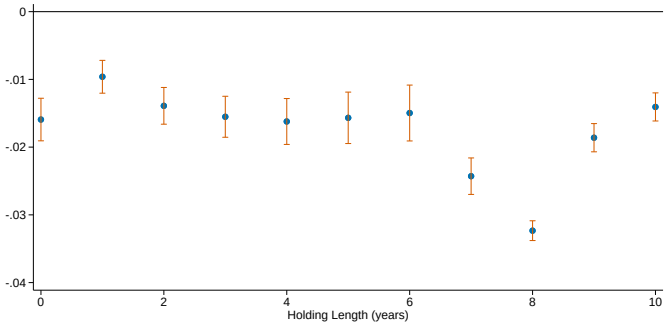
- Gender gap $= \left(\frac{2\delta}{t} + \gamma\right)$
- Gender gap asymptotes toward 0, implying $\delta > 0$ and $\gamma \approx 0$
- Suggests gender gap arises primarily from differences in execution prices, not maintenance or preferences for properties with naturally higher returns

Gender gap in **purchase price** by holding length



- Gender gap in purchase price does not asymptote toward 0
- But the impact of the gender gap in purchase price on annualized returns decreases with holding length

Gender gap in **sale price** by holding length



- Gender gap in sale price does not asymptote toward 0
- But the impact of the gender gap in purchase price on annualized returns decreases with holding length

Variation by market tightness

Market tightness $\equiv$ fraction of listings sold within each county-month

In tight markets, multiple buyers compete in auctions

- Bilateral negotiation should matter less

As the market tightens, gender gap in returns, prices, and discounts shrink toward zero

- Inconsistent with men buying riskier properties or investing more in maintenance/upgrades
- Inconsistent with women getting more utility from housing (as the only explanation), because they would bid higher

Variation by market tightness

	Unlevered Ann Return	Purchase Discount	Sale Discount	Log(Purchase Price)	Log(Sale Price)
	(1)	(2)	(3)	(4)	(5)
Single Female	-0.016***	-0.275***	0.055***	0.023***	-0.029***
	(0.000)	(0.018)	(0.014)	(0.001)	(0.001)
Couple	-0.012***	-0.236***	0.018	0.011***	0.016***
	(0.000)	(0.018)	(0.014)	(0.001)	(0.001)
Other		0.018	0.422***	0.030***	-0.061***
		(0.015)	(0.016)	(0.002)	(0.002)
Singe Female X Tightness	0.019***	0.283***	-0.554***	-0.039***	0.013***
	(0.002)	(0.090)	(0.066)	(0.004)	(0.004)
Couple X Tightness	-0.002	0.415***	-0.141**	-0.007	-0.036***
	(0.002)	(0.087)	(0.067)	(0.006)	(0.005)
Other X Tightness		0.076	-0.000	-0.012	0.037***
		(0.072)	(0.074)	(0.008)	(0.009)
Property FE	No	No	No	Yes	Yes
Zip-Year-Month FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.355	0.207	0.208	0.886	0.886
Observations	8,635,824	19,845,356	19,845,356	46,602,251	46,602,251

Magnitudes in returns and in dollars

Large gap in **returns**

- Women earn 1pp lower unlevered, and 6pp lower levered returns
- For the typical levered homeowner, that is like missing out on the **equity premium**

Large gender gap in **dollars**

- For the median house price of $140K in 2016, and median holding period of 4.6 years, women lose $1,370 per year relative to men
- Half the size of the **gender wage gap** of $2800 per year (Blau and Kahn 2017)

Conclusion

Large gender gap in housing returns

- Women buy the same property to 2% more and sell for 2% less

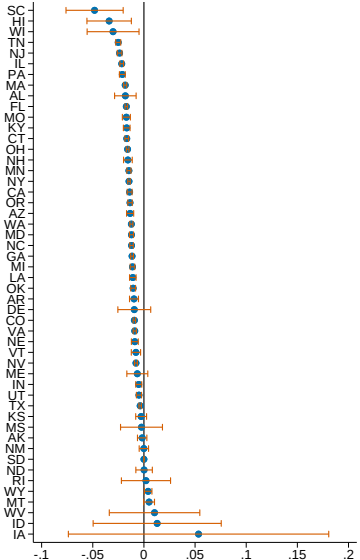
Implications

- Gender gap in housing returns will contribute to the gender wealth gap
- Negotiated discount, choice of listing price, and timing all matter
- Women may be better off holding for longer or sorting toward tighter markets
- We show that women have worse negotiated outcomes in housing, but...
  - Does not necessarily imply women are doing anything wrong (Exley et al. 2018)
  - *Women don't ask* or *Women don't get*? (Ayres and Siegelman 1995)

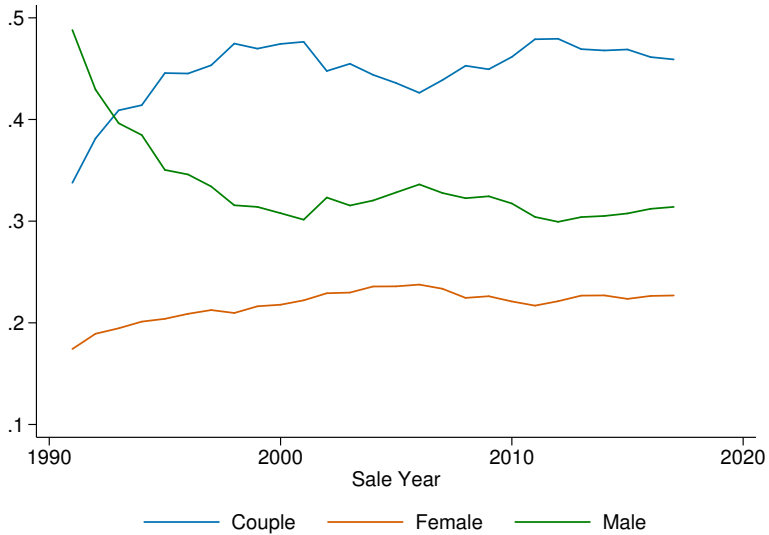
Summary statistics

	Gender Group				
Panel A: Full Sample	Single Male	Single Female	Couple	Other	Overall
Log(Sale Price)	11.9473	11.9125	12.1383	12.1104	12.0704
Sample Size	7,721,833	5,751,347	10,127,535	29,283,151	52,883,866
Panel B: Listing Sample					
Log(Sale Price)	12.0798	12.0292	12.2709	12.0597	12.1095
Log(List Price)	12.0677	12.0236	12.2689	11.9539	12.0547
Sale Discount (p.p.)	2.8908	3.0368	2.5413	3.0954	2.9261
Log(Days on Market)	3.7339	3.7052	3.7016	3.7851	3.7467
Sample Size	3,100,949	2,728,421	4,689,273	9,524,421	20,043,064
Panel C: Returns Sample					
Log(Sale Price)	12.1429	12.0692	12.3342	-	12.2138
Annualized Unlevered Returns	0.0847	0.0692	0.0647	-	0.0720
Holding Length (Years)	5.2816	5.7174	5.9840	-	5.7029
Log(Purchase Price)	11.8990	11.8313	12.0793	-	11.9663
Purchase Discount (p.p.)	2.8150	2.5388	2.5629	-	2.6379
Sample Size	2,935,077	2,128,157	4,288,185	-	9,351,419

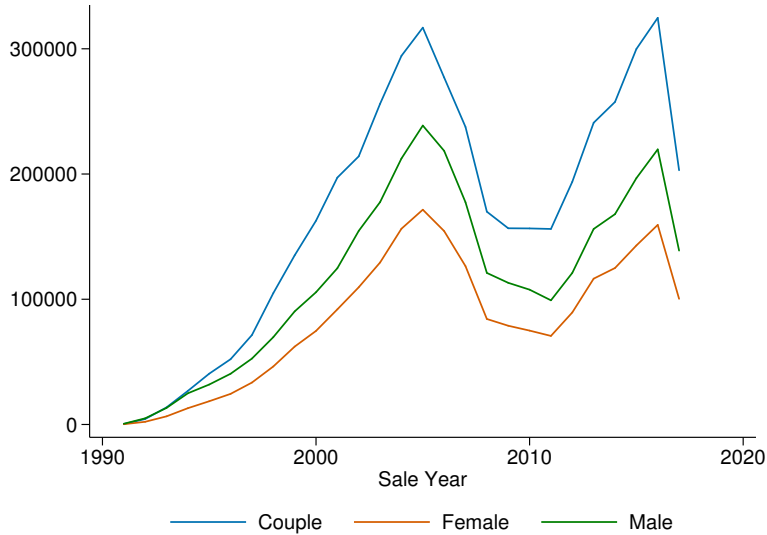
Variation across states



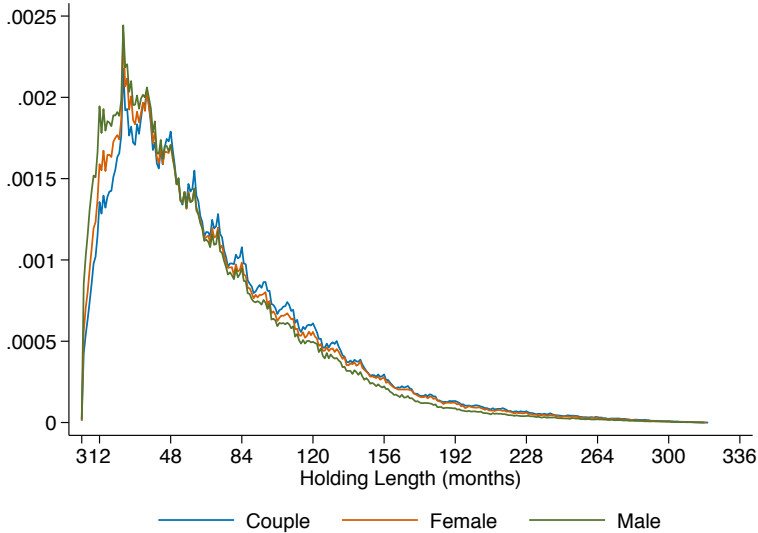
Composition of transactions



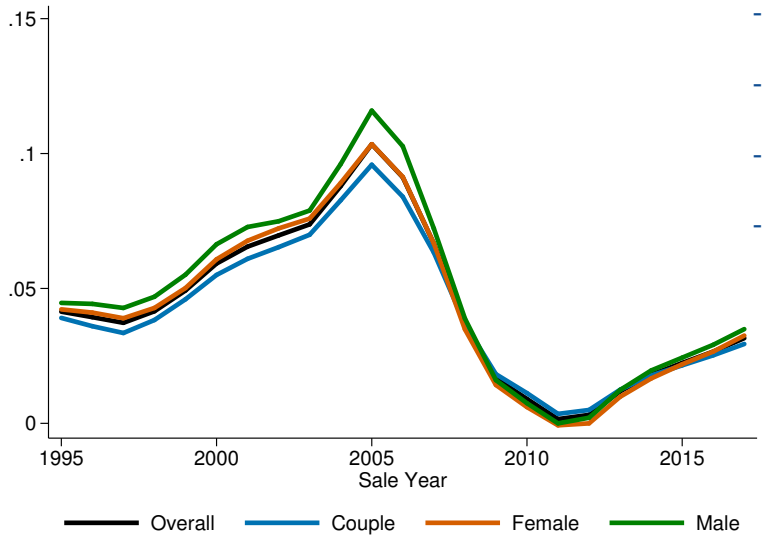
Sale transactions over time



Transaction share by holding length

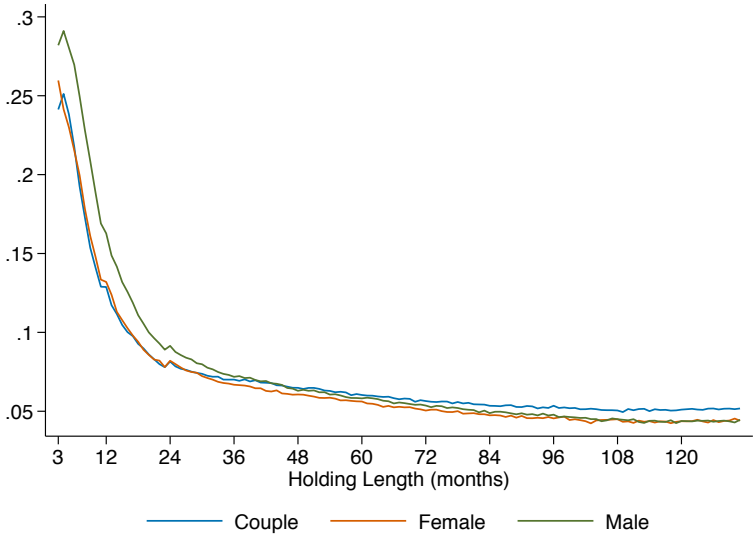


Median annualized unlevered returns over time



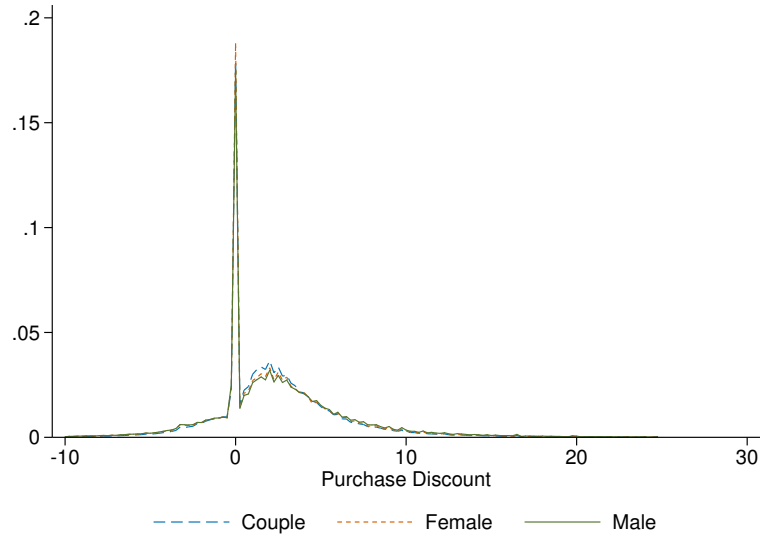
- Annualized return by *sale* year
- Strong variation over time
- Large gap in mean returns
- Smaller gap in *median* returns

Variation in unlevered returns by holding period

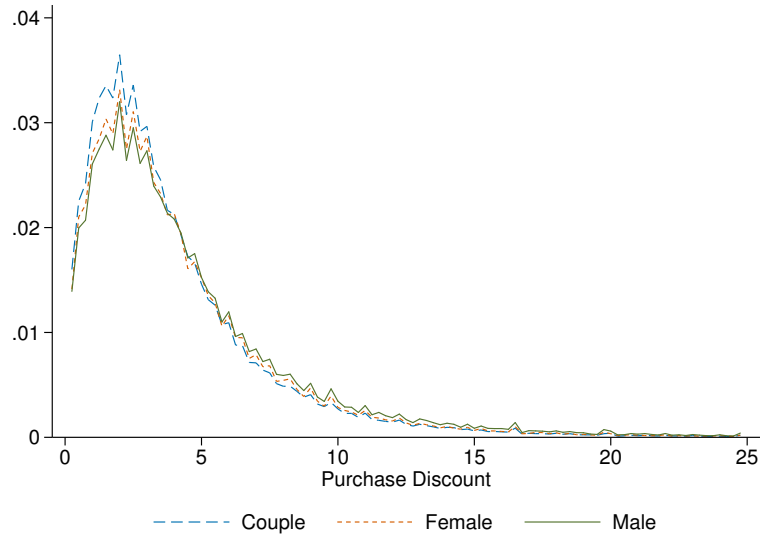


- Annualized return varies with holding length, possibly due to selection
- Will see later that gender gap also varies with holding length

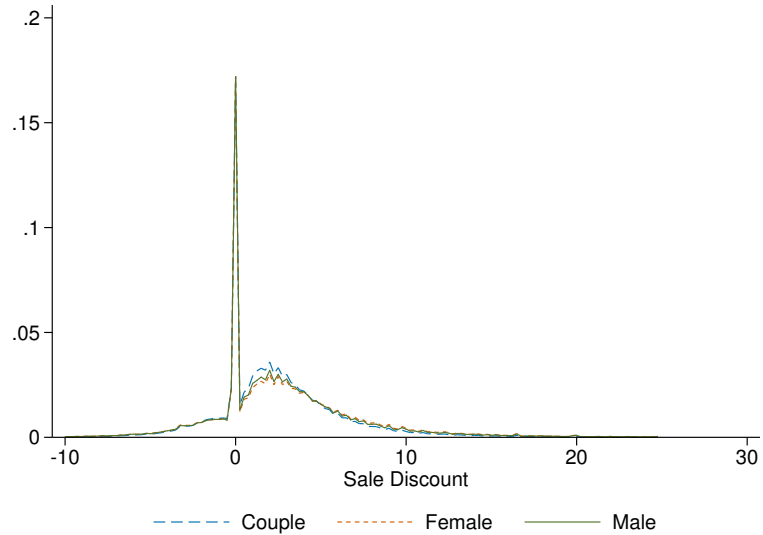
Distribution of purchase discount



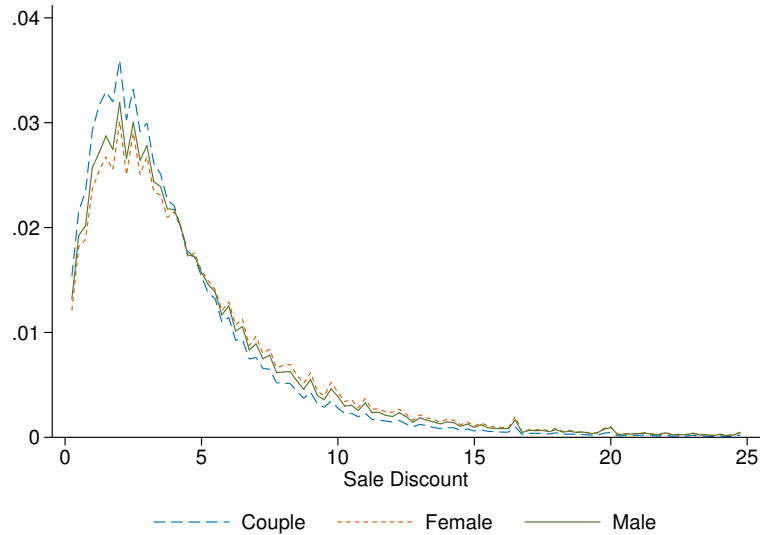
Distribution of purchase discount: zoomed



Distribution of sale discount



Distribution of sale discount: zoomed



Days on market

	Sale Log(Days on Mkt)	Purchase Log(Days on Mkt)	Unlevered Ann Return
	(1)	(2)	(3)
Single Female	-0.031***	-0.034***	-0.013***
	(0.003)	(0.003)	(0.000)
Couple	-0.041***	0.008***	-0.016***
	(0.003)	(0.003)	(0.000)
Sale Log(Days on Mkt)			-0.003***
			(0.000)
Purchase Log(Days on Mkt)			-0.003***
			(0.000)
Zip-Year-Month FE	Yes	Yes	Yes
R-squared	0.415	0.309	0.398
Observations	2,024,580	2,024,580	2,024,580

Selection of Property Characteristics

	Upgraded	New Construction	Log(House Age)	Log(Sq Ft)	Log(Agent Popularity)
	(1)	(2)	(3)	(4)	(5)
Single Female	-0.009***	0.002***	-0.020***	-0.066***	-0.019***
	(0.001)	(0.000)	(0.003)	(0.001)	(0.002)
Couple	0.000	0.033***	-0.137***	0.143***	0.148***
	(0.001)	(0.001)	(0.004)	(0.002)	(0.003)
Zip-Year-Month FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.299	0.274	0.515	0.448	0.255
Observations	3,542,111	9,351,419	2,211,953	2,007,061	4,000,582

Unlevered returns: weighted by holding length

	Unlevered Ann Return		
	(1)	(2)	(3)
Single Female	-0.006***	-0.005***	-0.004***
	(0.000)	(0.000)	(0.000)
Couple	-0.005***	-0.001***	0.000***
	(0.000)	(0.000)	(0.000)
Holding Length			-0.002***
			(0.000)
Zip-Year-Month FE	No	Yes	Yes
R-squared	0.001	0.384	0.389
Observations	9,351,419	9,351,419	9,351,419

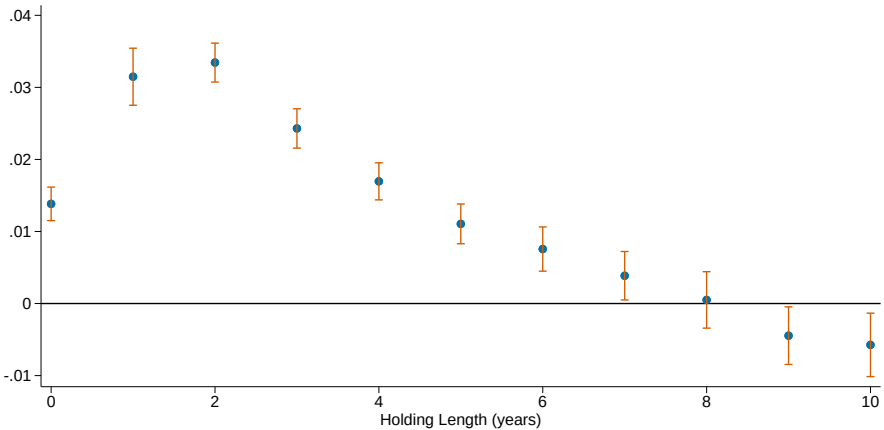
Levered returns: weighted by holding length

	Lev Ann Ret (missing=0%)	Lev Ann Ret (missing=80%)	Lev Ann Ret (LTV=80%)
	(1)	(2)	(3)
Single Female	-0.009***	-0.014***	-0.014***
	(0.000)	(0.000)	(0.000)
Couple	0.002***	-0.002***	0.004***
	(0.000)	(0.000)	(0.000)
Holding Length	-0.011***	-0.013***	-0.007***
	(0.000)	(0.000)	(0.000)
Zip-Year-Month FE	Yes	Yes	Yes
R-squared	0.337	0.329	0.328
Observations	9,351,419	9,351,419	9,351,419

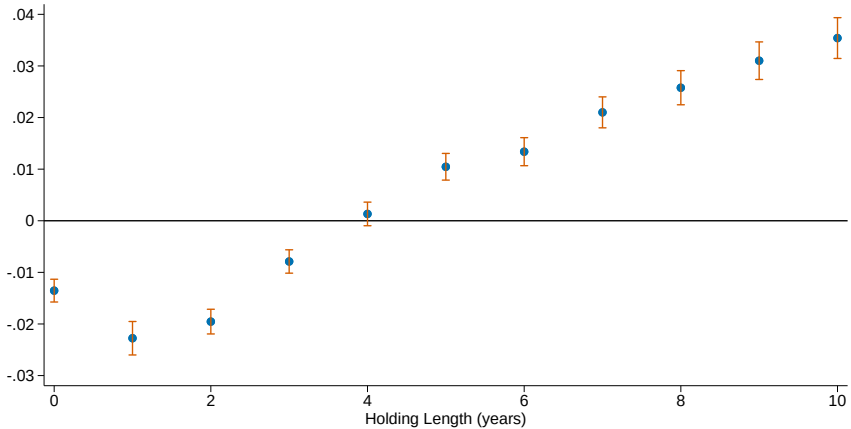
Match rates

Seller Gender	Buyer Gender: Single Male	Single Female	Couple	Overall
Single Male	0.1385 [0.1207]	0.0868 [0.0830]	0.1010 [0.1225]	0.3262
Single Female	0.0936 [0.0901]	0.0748 [0.0620]	0.0752 [0.0915]	0.2437
Couple	0.1378 [0.1591]	0.0930 [0.1095]	0.1993 [0.1615]	0.4301
Overall	0.3700	0.2546	0.3755	1

Purchase price by holding length: Couples – Single Male

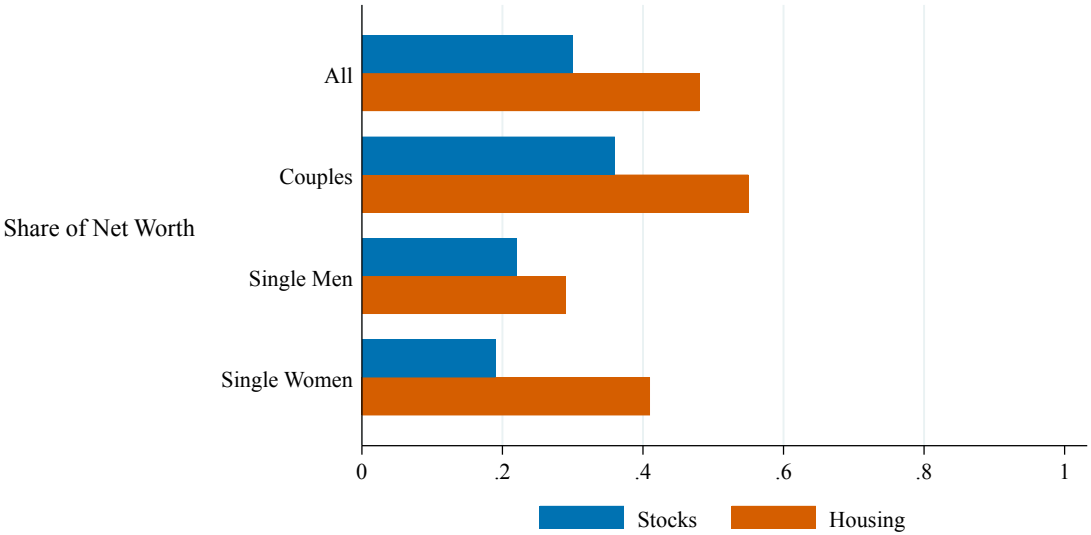


Sale price by holding length: Couples — Single Male

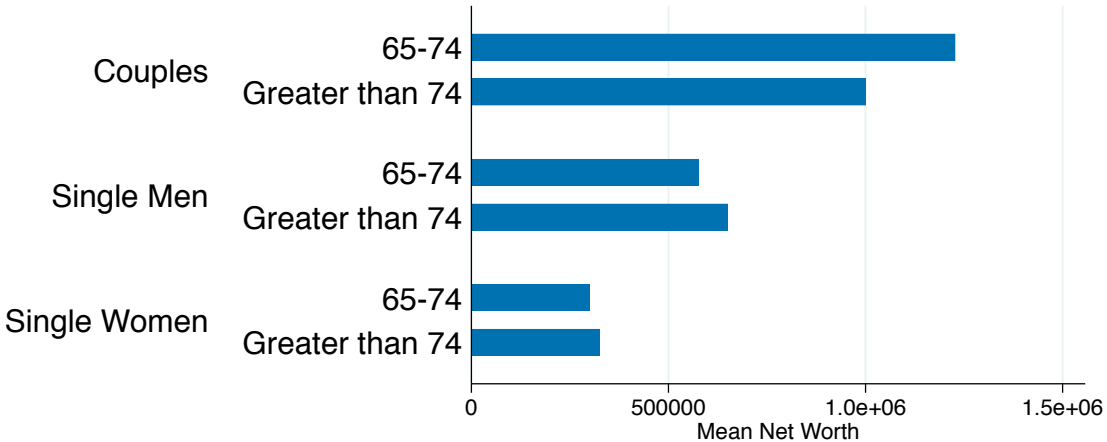


Background on housing and wealth

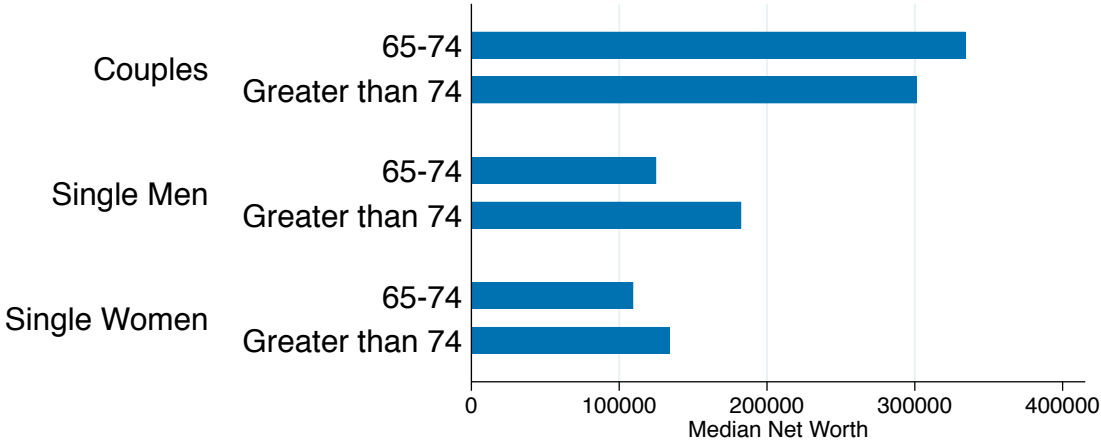
Stock market vs. housing wealth share



Mean wealth at retirement



Median wealth at retirement



Transaction price

	Log(Purchase Price)		Log(Sale Price)	
	(1)	(2)	(3)	(4)
Single Female	0.013***	0.018***	-0.032***	-0.027***
	(0.001)	(0.001)	(0.001)	(0.001)
Couple	0.023***	0.029***	0.007***	0.014***
	(0.002)	(0.001)	(0.001)	(0.001)
Other	0.085***	0.015***	-0.064***	-0.054***
	(0.005)	(0.003)	(0.002)	(0.001)
Property FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	No	Yes	No
Zip-Year-Month FE	No	Yes	No	Yes
R-squared	0.794	0.886	0.793	0.887
Observations	52,883,866	52,883,866	52,883,866	52,883,866

List price

	Log(Purchase List Price)		Log(Sale List Price)	
	(1)	(2)	(3)	(4)
Single Female	0.035***	0.033***	-0.019***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
Couple	0.017***	0.015***	-0.025***	0.002**
	(0.001)	(0.001)	(0.002)	(0.001)
Other	-0.076***	-0.060***	-0.164***	-0.093***
	(0.002)	(0.002)	(0.004)	(0.002)
Property FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	No	Yes	No
Zip-Year-Month FE	No	Yes	No	Yes
R-squared	0.784	0.842	0.786	0.842
Observations	10,984,588	10,984,588	10,984,588	10,984,588

Discount relative to listing price

	Purchase Discount		Sale Discount	
	(1)	(2)	(3)	(4)
Single Female	-0.283***	-0.260***	0.146***	0.107***
	(0.007)	(0.005)	(0.007)	(0.005)
Couple	-0.141***	-0.059***	-0.350***	-0.190***
	(0.013)	(0.005)	(0.013)	(0.005)
Other	0.452***	0.475***	0.205***	0.167***
	(0.012)	(0.007)	(0.018)	(0.011)
Zip-Year-Month FE	No	Yes	No	Yes
R-squared	0.003	0.210	0.002	0.209
Observations	20,043,064	20,043,064	20,043,064	20,043,064

- Discount $=$ (list price $-$ transaction price) / list price $\times$ 100
- Larger discount benefits the buyer and hurts the seller