

# Architecture Award and Conspicuous Premium of Housing

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# Motivation: Our Starting Point

- **The Interlace** : completed in Singapore in 2013; 1,040 condo-apartment units. Prices were soft.
- A series of architecture-design awards in 2014 & 2015.
  - The Chicago Athenaeum International Architecture Award
  - World Architecture Festival: World Building of the Year (Winner) & Winner of Housing
  - Prices have been so persistent



- Whether winning an architecture-design award leads to a **causal premium** in housing prices?
- What is the **economics** behind the premium?
  - *Conspicuous consumption?*
    - households consuming certain goods priced at a premium that exemplify their social status and esteem
  - *Investment motive for safe assets?*
    - housing investors might consider projects with architecture awards as safe assets, which have lower risks and better upside potential due to those projects' visibility
  - *Quality confirmation?*
    - homebuyers might take an architecture award as a general signal of good project quality. The prices could rise after that the project receives an award.

# Conspicuous Demand

- Consume items priced at a premium that exemplify status and esteem (Veblen, 1899).
- Demand not on the goods' attributes and quality.
- But on the **brand name** that signifies social standing and self-worth (Cass and Frost, 2002).
- Evident in goods consumption (Zinkhan and Prenshaw, 1994; Byrne, 1999)
- Triggered by globalization and media; expected to grow by 3% a year through 2020 (Bain and Company, 2016)



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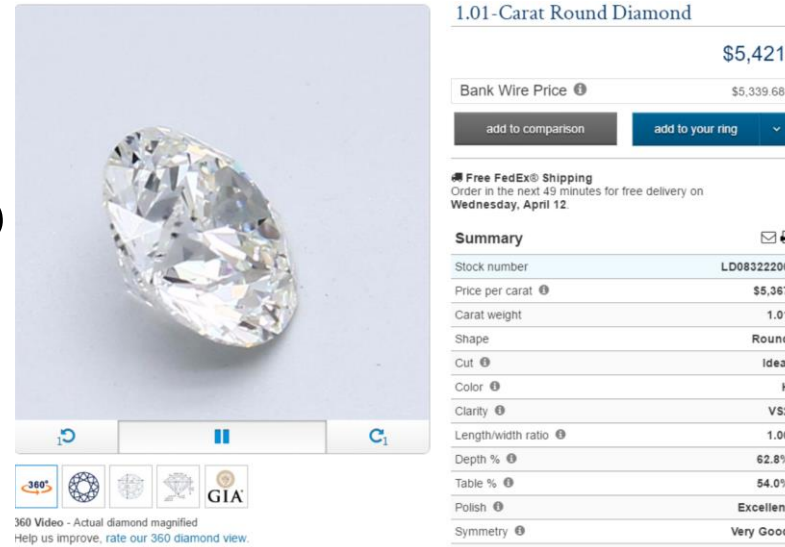
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# Branding of Real Estate

- Branding is difficult for developers: Every real estate is unique.
  - Award-winning architecture is the branding (Borja, 2003).
  - Award illustrates brand names to indicate social status and prestige (Frey, 2006)
- ➔ Command a conspicuous premium



Palm Jumeirah, Dubai



Cayan Tower, Dubai



One Central Park, Australia



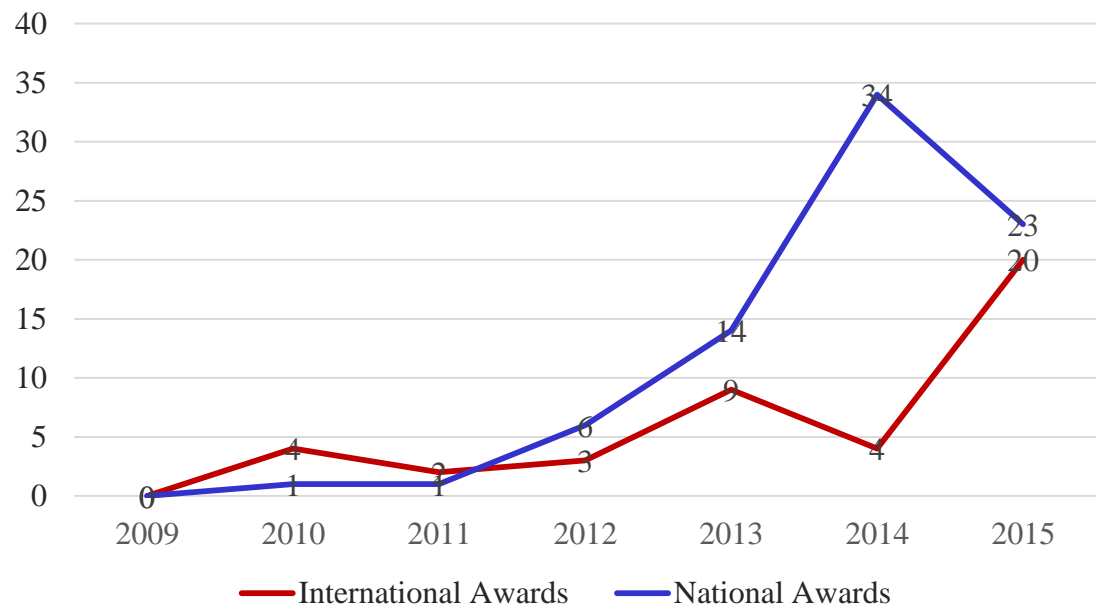
- Impact of architectural amenity: Silent on conspicuous demand
  - Architecture style: Smith & Morehouse (1993); Buitelaar & Schilder (2017); Ahlfeldt & Homan (2016)
  - Architecture awards: Hough & Kratz (1983); Fuerst et al., (2001)
  - 14% - 17% prices premium.
  - Lack an econometric method to disentangle the two:
    - premium triggered by psychological desire to status symbol of award-winning buildings
    - premium placed on superior quality of aesthetic architecture.
- Conspicuous consumption of real estate: Lack a direct test
  - The notion: Zahirovicand & Chatterjee (2011)
  - Indirect evidence at city-level: Lee and Mori (2016)

- Difference-in-Differences (DD) identifies the causal premium created by brand-building events of winning architecture awards.
  - Confirm a significant architecture-award premium that weighs 2% to 7% of housing prices on average.
- Propensity Score Matching (PSM) removes confounding of pretreatment factors.
- Test of competing hypothesis:
  - We implement several models of Difference-in-Differences-in-Differences (DDD) and look into the dimensions of size, project quality, award supply and spillovers to evaluate the three competing hypotheses.
  - The results consistently support the *conspicuous-demand* but show no evidence for the *investment motive* and *quality confirmation*.

# Singapore: Ideal for the Research Purpose

- High GDP per capita and many millionaires; high density rousing 5 million people to frequent human contact and interaction → Strong conspicuous demand.
- Singapore is free from natural disasters → Increasing architecture awards received by condominiums.
- The condominium residents are among the most affluent due to Singapore's duo housing market.

Number of awards received by Singapore condos (2009-2015)





- Condominium projects
  - The Green Mark Directory literally lists out all the new condominiums since 04/2008: a total of 75 condominiums with detailed project level information including developers and architects.
  - A unique project workmanship quality score: CONQUAS score
- Architecture-awards
  - All the international and national awards won by the 75 projects during the sample period. There are 23 award-winning and 52 non-award winning condominiums.
- Transaction data
  - Real Estate Information System (REALIS)
  - 32,281 transactions of private condo units during the period
  - 31% in award-winning and 69% in non-award-winning projects.

- Causal impact of winning an architecture award on housing prices
- **Treated:**
  - Award-winning condominiums
  - Each treated project  $j$  is paired with one project  $j'$  in the control group; the control group is assigned with the award time of its paired treated group.
- **Event window:** 3-month pre-treatment + 9-month post-treatment

$$\ln P_{i,j,t} = X_{i,j,t}\alpha + \beta A_j \cdot T_{jj',t}^{After} + \delta T_{jj',t}^{After} + \gamma_j + \tau_t + \varepsilon_{ijt}$$

- $P_{i,j,t}$ : the price of unit  $i$  in project  $j$  transacted at time  $t$ .
- $A_j$ : award-winning indicator (the treated = 1).
- $T_{jj',t}^{After}$ : post-treatment indicator for the award-winning project  $j$  and its paired non-award-winning counterpart  $j'$ .
- $\beta$  is the DD estimator

- Identify comparable treated and non-treated condominiums.
- Architecture awards involve selection.
- Having rich project information, we can use PSM because the selection is on observables.
- Probit regression on pretreatment factors to predict the propensity score of award winning.
- One-to-one nearest-neighbor matching within the common support and without replacement.
- The matched sample: 19 award-winning projects (treatment) and 19 non-award-winning projects (control).

# Summary Statistics and Matching Quality

*Table 1: Summary statistics of project and transaction level data*

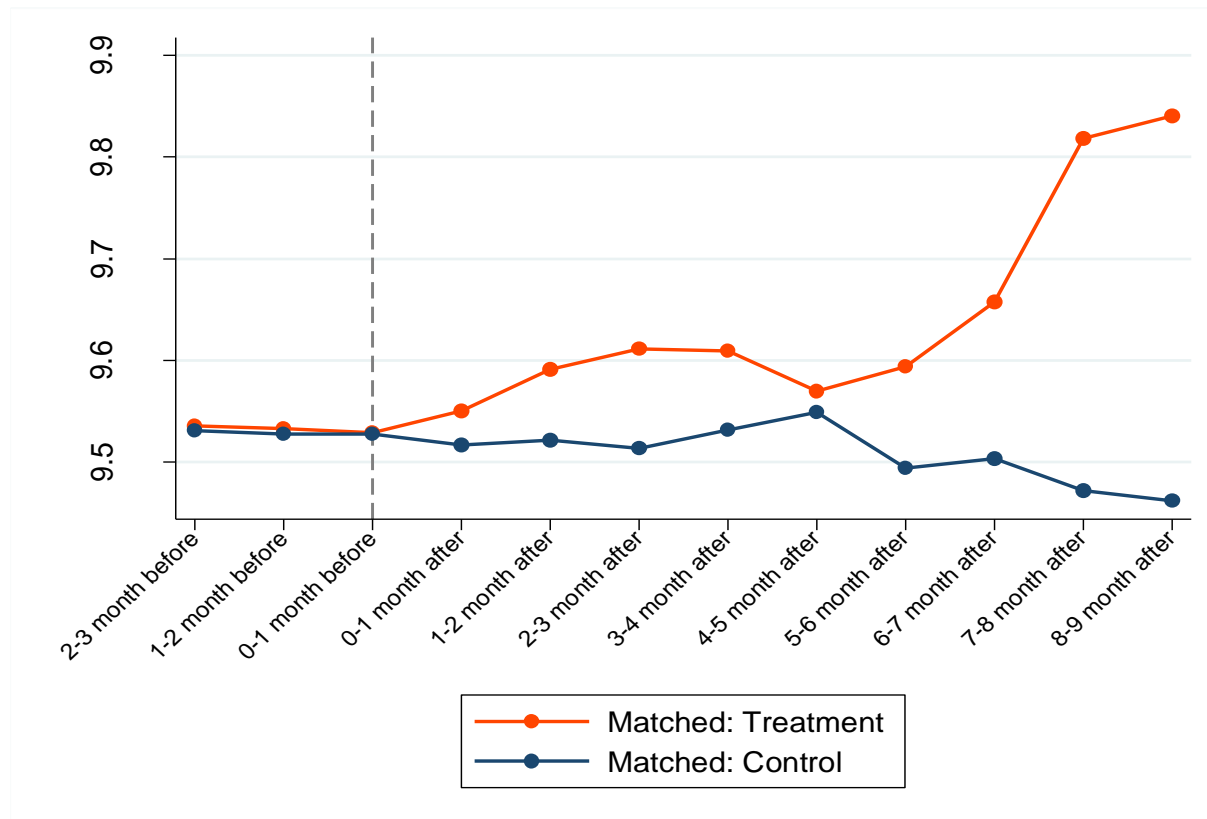
Panel A	Full (unmatched) Sample	Variable	Control Group		Treatment Group		Mean difference
			Obs.	Mean	Obs.	Mean	
		Completion year	52	2014.54	23	2014.96	-0.418
		GFA ('000 sqm)	52	40.978	23	63.132	-22.154**
		Distance to CBD (km)	52	2.125	23	1.940	0.185
		Developers' awards	52	0.558	23	3.087	-2.529***
		Architects' awards	52	0.827	23	2.783	-1.956***
	Matched Sample	Variable	Obs.	Mean	Obs.	Mean	Mean difference
		Completion year	19	2014.89	19	2015.05	-0.158
		GFA ('000 sqm)	19	49.947	19	48.122	1.825
		Distance to CBD (km)	19	1.988	19	1.950	0.039
		Developers' awards	19	1.474	19	2.421	-0.947
		Architects' awards	19	1.947	19	2.368	-0.421
Panel B	Matched Sample	Variable	Obs.	Mean	Std. Dev	Min	Max
		Ln (Total Price)	1,434	14.136	0.496	13.288	16.159
		Age	1,428	0.246	0.634	0	5
		Floor level	1,434	10.913	7.600	1	44
		Area (sqm)	1,434	104.010	46.084	41	448

PSM removes imbalance of pretreatment factors in the treatment and control groups and resolve confounding.

Note: The dataset is obtained from REALIS. \* indicates significance level at 10%, \*\* indicates significance level at 5%, and \*\*\* indicates significance level at 1%.

# Preliminary Check on the Common Trend

- The DD critically relies on the common trend assumption.
- Plot the average raw transacted prices of the matched treatment and control



# Results: Baseline regression

**Table 2: Baseline DD regression results**

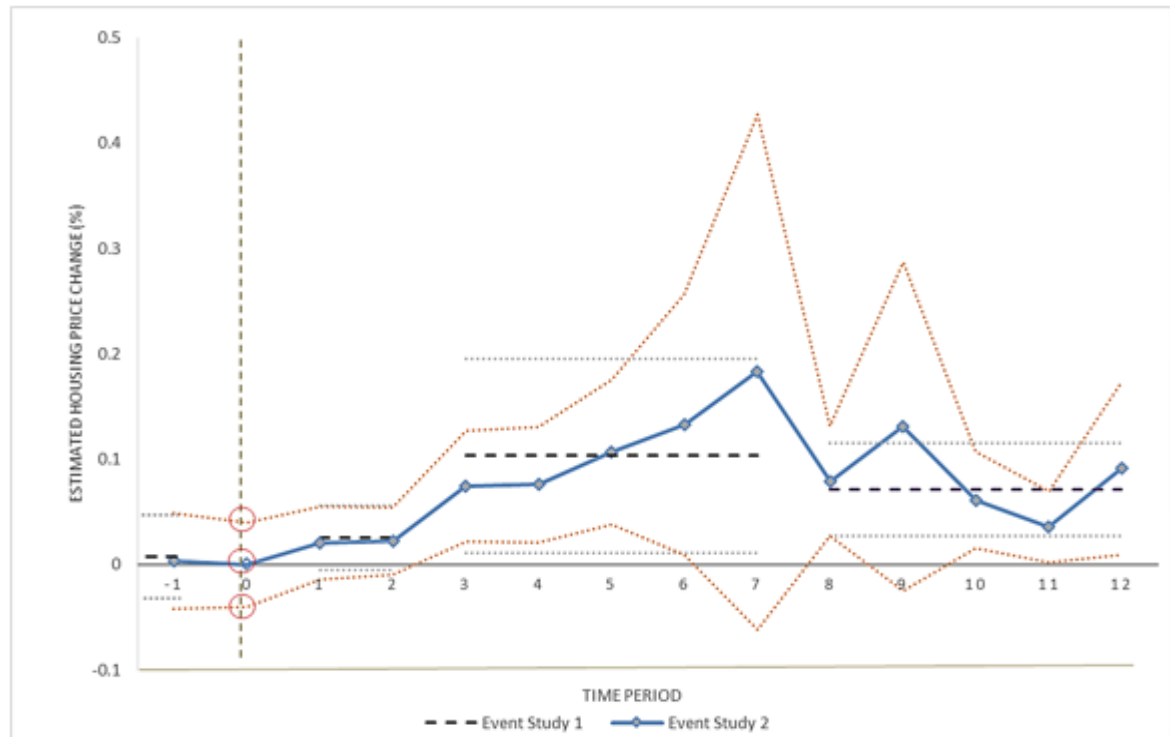
	(1)	(2)	(3)	(4)	(5)	(6)
Sample	Matched Sample	International Award Strata	National Award Strata	Pooled Sample	Award Winning (Treated) Projects Only	Long-term Dynamics
Dependent Variable	Ln (Price)	Ln (Price)	Ln (Price)	Ln (Price)	Ln (Price)	Ln (Price)
Age	-0.019 (0.022)	-0.011 (0.047)	-0.033* (0.017)	-0.024 (0.022)	-0.004 (0.029)	-0.038* (0.022)
Floor level	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.001)	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.001)
Area (sqm)	0.012*** (0.001)	0.012*** (0.001)	0.015*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)
Area <sup>2</sup>	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
After	-0.012 (0.007)	-0.010 (0.008)	-0.033 (0.022)	-0.013* (0.007)	<b>0.035**</b> <b>(0.017)</b>	
Award × After	<b>0.047***</b> <b>(0.015)</b>	<b>0.053**</b> <b>(0.025)</b>	<b>0.043**</b> <b>(0.020)</b>			
International award × after				<b>0.059***</b> <b>(0.022)</b>		
National award × after				<b>0.028***</b> <b>(0.008)</b>		
Award × 90-46 days before						<b>0.008</b> <b>(0.020)</b>
Award × 1-90 days after						<b>0.025</b> <b>(0.015)</b>
Award × 90-315 days after						<b>0.103**</b> <b>(0.045)</b>
Award × 316-540 days after						<b>0.071***</b> <b>(0.022)</b>
Constant	12.953*** (0.065)	12.988*** (0.088)	12.919*** (0.099)	12.950*** (0.065)	13.017*** (0.105)	12.914*** (0.062)
Event-time fixed effect <sup>a</sup>	No	No	No	No	No	Yes
Project fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1428	876	556	1428	882	1836
R-squared	0.978	0.976	0.985	0.978	0.982	0.974

- A 4.7% increment in housing prices after achieving an award.
- Greater effect of international awards.



# Testing Common Trend and Long Term Effect

**Figure 3:** Long-term dynamics of the award-winning premium



Common Trend: Pre-treatment effect is close 0.

Rule out reverse causality:

- Pre-treatment prices do not relate to the award winning event.
- The event causes prices.
- Word-of-mouth.
- Long lasting

Note: The figure exhibits the event study in a 3-month pretreatment and 18-month post-treatment period. Each period is a 45-day interval. 1) The horizontal black and grey dash line are the estimated coefficients and confidence interval of event study 1 from Column 2 of Table 3. 2) The blue line represents estimated price response of event study 2 for each 45-day interval, and its confidence intervals are the red dash line. 3) The base group is period 0, which is from 45 to 0 days before the award announcement. Its coefficients and confidence intervals are marked with circles, because they are not estimable from the regression models. Their values here are defined as 0 by construction or interpolated from the ranges of the adjacent intervals. 4) Period 7 has only 39 observations thus its confidence interval gets larger.

# Robustness Test: Falsification

Falsification: assign a random transaction date to each transaction record and re-run DD: no effect.

➔ The positive premium does come from the event of winning an award.

**Table 4:** Falsification test

Sample	(1) Matched Sample	(2) International Award Strata	(3) National Award Strata	(4) Pooled Sample
Dependent Variable	Ln (Price)	Ln (Price)	Ln (Price)	Ln (Price)
After (false)	-0.004 (0.007)	0.003 (0.003)	-0.026** (0.012)	-0.002 (0.006)
Award × After (false)	-0.005 (0.008)			
International award × After (false)		-0.008 (0.009)		-0.007 (0.008)
National award × After (false)			0.020 (0.013)	-0.009 (0.008)
Unit characteristics and constant	Yes	Yes	Yes	Yes
Project fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Number of observations	1428	876	556	1428
R-squared	0.977	0.975	0.985	0.977

Note: Housing characteristics and constants are suppressed from the table. The treatment indicator Award is absorbed by the project fixed effect. The dependent variable is the logarithmic transaction price. Standard errors are clustered at project level. The 1%, 5% and 10% significance levels are denoted by \*\*\*, \*\* and \*, respectively.

# The underlying economics of the premium

Competing hypothesis: **conspicuous consumption** VS. **search for safe asset (investment motive)**.

Stronger effect on housing units catering for the richest households – supporting conspicuous demand against the other.

**Table 5:** Testing the conspicuous-demand hypothesis: Effect of large-size units

Sample	(1) Large Unit	(2) Small Unit	(3) Matched Sample	(4) Matched Sample
Dependent Variables	Ln (Price)	Ln (Price)	Ln (Price)	Ln (Price)
After	-0.028 (0.029)	0.009 (0.008)	0.000 (0.009)	0.002 (0.007)
<b>Award × After</b>	<b>0.074*</b> <b>(0.037)</b>	<b>0.020</b> <b>(0.015)</b>	0.026* (0.015)	0.023 (0.014)
Large Unit			-0.041 (0.038)	0.008 (0.035)
<b>Award × After × Large Unit</b>			<b>0.072**</b> <b>(0.035)</b>	<b>0.065**</b> <b>(0.029)</b>
After × Large Unit			-0.052 (0.033)	-0.047* (0.024)
Award × Large Unit			-0.030 (0.031)	-0.026 (0.027)
Unit characteristics and constant	Yes	Yes	Yes	Yes
Event-time fixed effect	No	No	No	No
Project fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	No
Separate year fixed effect for large and small units	No	No	No	Yes
Number of observations	445	983	1428	1428
R-squared	0.981	0.968	0.979	0.980

Note: Housing characteristics and constants are suppressed from the table. The treatment indicator Award is absorbed by the project fixed effect. The dependent variable is the logarithmic transaction price. Standard errors are clustered at project level. The 1%, 5% and 10% significance levels are denoted by \*\*\*, \*\* and \*, respectively.

# The underlying economics of the premium

Competing hypothesis: **conspicuous consumption** VS. **quality confirmation**.  
No higher award premium for high quality projects— no signaling for quality .

**Table 6:** Testing the conspicuous-demand hypothesis: Effect of CONQUAS score

Sample Dependent Variable	(1) High Quality (>1.2 s.d.) Matched Sample	(2) High Quality (>1 s.d.) Matched Sample
	Ln (Price)	Ln (Price)
After	-0.028 (0.019)	-0.025 (0.019)
<b>Award × After × High Quality <sup>a</sup></b>	<b>-0.004</b> <b>(0.039)</b>	<b>-0.007</b> <b>(0.028)</b>
<b>Award × After</b>	<b>0.065<sup>**</sup></b> <b>(0.023)</b>	<b>0.075<sup>***</sup></b> <b>(0.019)</b>
After × High Quality	0.008 (0.025)	-0.009 (0.026)
Unit characteristics and constant	Yes	Yes
Project fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Number of observations	660	660
R-squared	0.987	0.987

Note: <sup>a</sup> High quality is defined as an indicator for projects of which CONQUAS Scores are 1.2 and 1 standard deviation higher than the mean score in Column 1 and 2, respectively. Projects in the High Quality groups are of better quality.

Housing characteristics and constants are suppressed from the table. The treatment indicator and other terms in DDD specification including Award, High Quality, and Award × High Quality are absorbed by the project fixed effect. The dependent variable is the logarithmic transaction price. Standard errors are clustered at project level. The 1%, 5% and 10% significance levels are denoted by \*\*\*, \*\* and \*, respectively.

# “Halo” effect

The influence of an award-winning building on its neighbors could be both positive and negative.

- conspicuous consumption: “you are what you’re surrounded by” → positive effect
- investment or quality confirmation motive → negative effect

**Table 7:** “Halo” effect

Sample	(1) Spillover: 250m	(2) Spillover: 500m
	Non-award projects within 1km to the nearest award-winning project Ln (Price)	Non-award Projects within 1km to the nearest award-winning project Ln (Price)
Dependent Variable		
After	-0.001 (0.004)	0.003 (0.004)
Within 250m	-0.038 (0.068)	
<b>Within 250m × After</b>	<b>0.038** (0.013)</b>	
Within 500m		0.008 (0.059)
<b>Within 500m × After</b>		<b>0.012 (0.016)</b>
Unit characteristics and constant	Yes	Yes
Project fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Number of observations	1753	1753
R-squared	0.981	0.981

Note: Housing characteristics and constants are suppressed from the table. The dependent variable is the logarithmic transaction price. Standard errors are clustered at nearest award-winning projects×proximity indicator level. The 1%, 5% and 10% significance levels are denoted by \*\*\*, \*\* and \*, respectively.

# The long-term impact of award supply

In the long run, the supply of awards in Singapore would be evidently increasing  
 If the award premium results from buyers' *conspicuous demand* to show off status → the award premium would diminish with the award supply.

**Table 8:** The long-term impact of award supply

Sample Dependent Variable	(1) Matched Sample Ln (Price)	(2) Matched Sample Ln (Price)
After	-0.017 (0.016)	-0.009 (0.009)
Award × After	0.088*** (0.029)	0.053*** (0.017)
Award × After × # of award in planning area <sup>a</sup>	-0.018* (0.010)	
Award × After × High award area <sup>b</sup>		-0.064*** (0.017)
Unit characteristics, constant, and other DDD interactions	Yes	Yes
Project fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Number of observations	1428	1428
R-squared	0.978	0.978

Note: <sup>a</sup> # of award in planning area denotes the number of awards within the planning area of awarded projects by the time the transaction happened. We assign the control group the same number of awards as there paired treated projects. <sup>b</sup> High award area is a binary dummy which equals to 1 for the projects located in a planning area whose awards are above 75<sup>th</sup> percentile of all the planning areas at the transaction time.

Housing characteristics, constants and other DDD terms that cannot be absorbed by the project fixed effect are suppressed from the table. These suppressed DDD terms include # of award in planning area, Award × # of award in planning area, After × # of award in planning area, High award area, Award × High award area, After × High award area. The dependent variable is the logarithmic transaction price. Standard errors are clustered at project level. The 1%, 5% and 10% significance levels are denoted by \*\*\*, \*\* and \*, respectively.



# Key take-away

Using the unique case of Singapore, this paper gauges the 4.7% causal premium from architecture award in real estate market.

- The premium comes from *conspicuous demand*, rather from *investment motives* or *signaling of project quality*.

The first paper to gauge conspicuous premium in real estate directly.

The demand for conspicuous housing can significantly affect the workings of the urban economy, for example:

- a caveat on income segregation and enclaves of modern housing development as developers cater the affluent household exclusively
- research on the economics of skyscrapers in high-density cities
- conspicuous demand in other real-estate sectors
- ...

Questions are welcome

Thank You!