



JSPS Grants-in-Aid for Creative Scientific Research

Understanding Inflation Dynamics of the Japanese Economy

House Prices at Different Stages of the Buying/Selling Process

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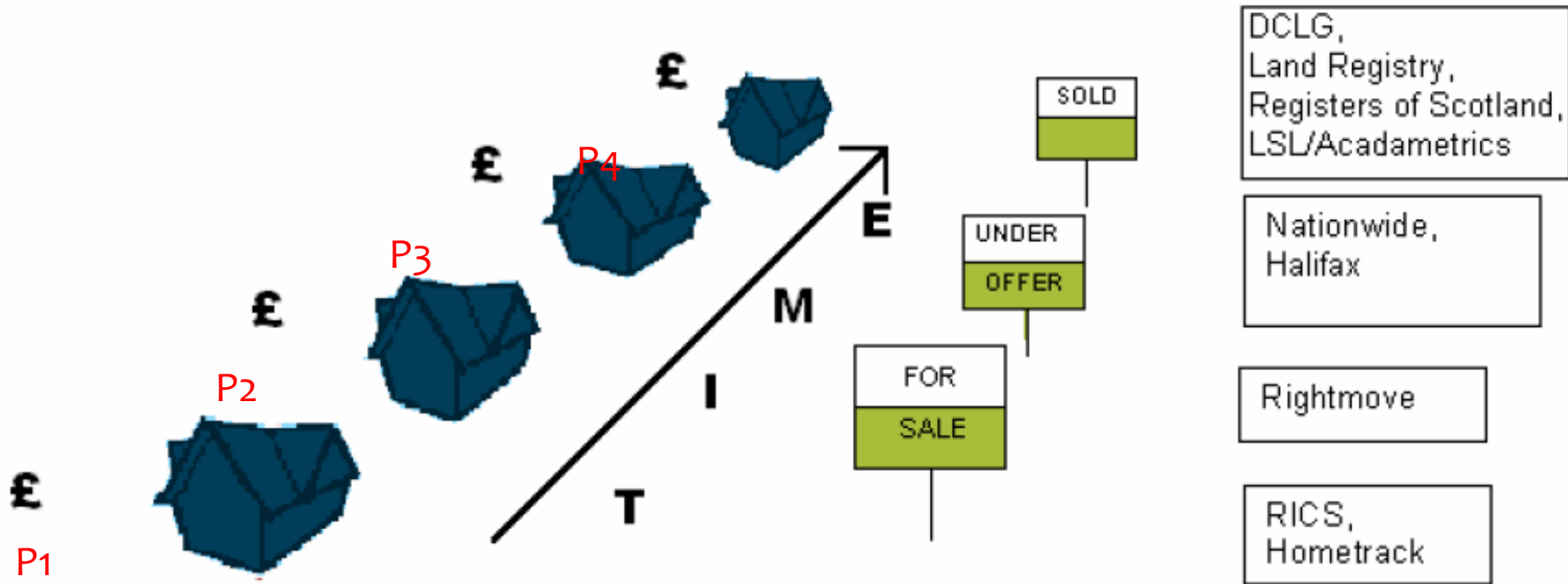
Kiyohiko G. Nishimura

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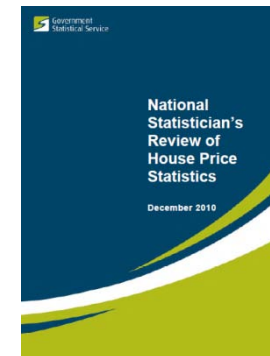
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Hitotsubashi University

February 10-11, 2011

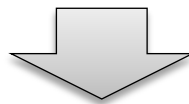


Source: National Statistician's Review of House Price Statistics, Government Statistical Services, December 2010



Key research question

Are house prices different depending on the stages of the buying/selling process?



We address this question by comparing the distributions of prices collected at different stages of the buying/selling process, including:

- (1) initial asking prices listed on a magazine,
- (2) asking prices at which an offer is made by a buyer,
- (3) contract prices reported by realtors after mortgage approval,
- (4) registry prices.

Four prices from three datasets

Three datasets for the prices of condominiums traded in Tokyo, 2005-2009:

Magazine dataset

This contains prices listed on “Housing Information Weekly” published by the largest vendor of housing information

Realtor dataset

This is collected by an association of real estate agencies through the Real Estate Information Network System (“REINS”)

Registry dataset

This is collected jointly by the Land Registry and the Ministry of Land, Infrastructure, Transport and Tourism

Four prices:

- P_1 Initial asking prices from the magazine dataset
- P_2 Final asking prices from the magazine dataset
- P_3 Contract prices from the realtor dataset
- P_4 Registration prices from the registry dataset

Universe: $N=360,243$

Magazine dataset

$N=155,347$

$N=26,496$

$N=14,890$

$N=7,551$

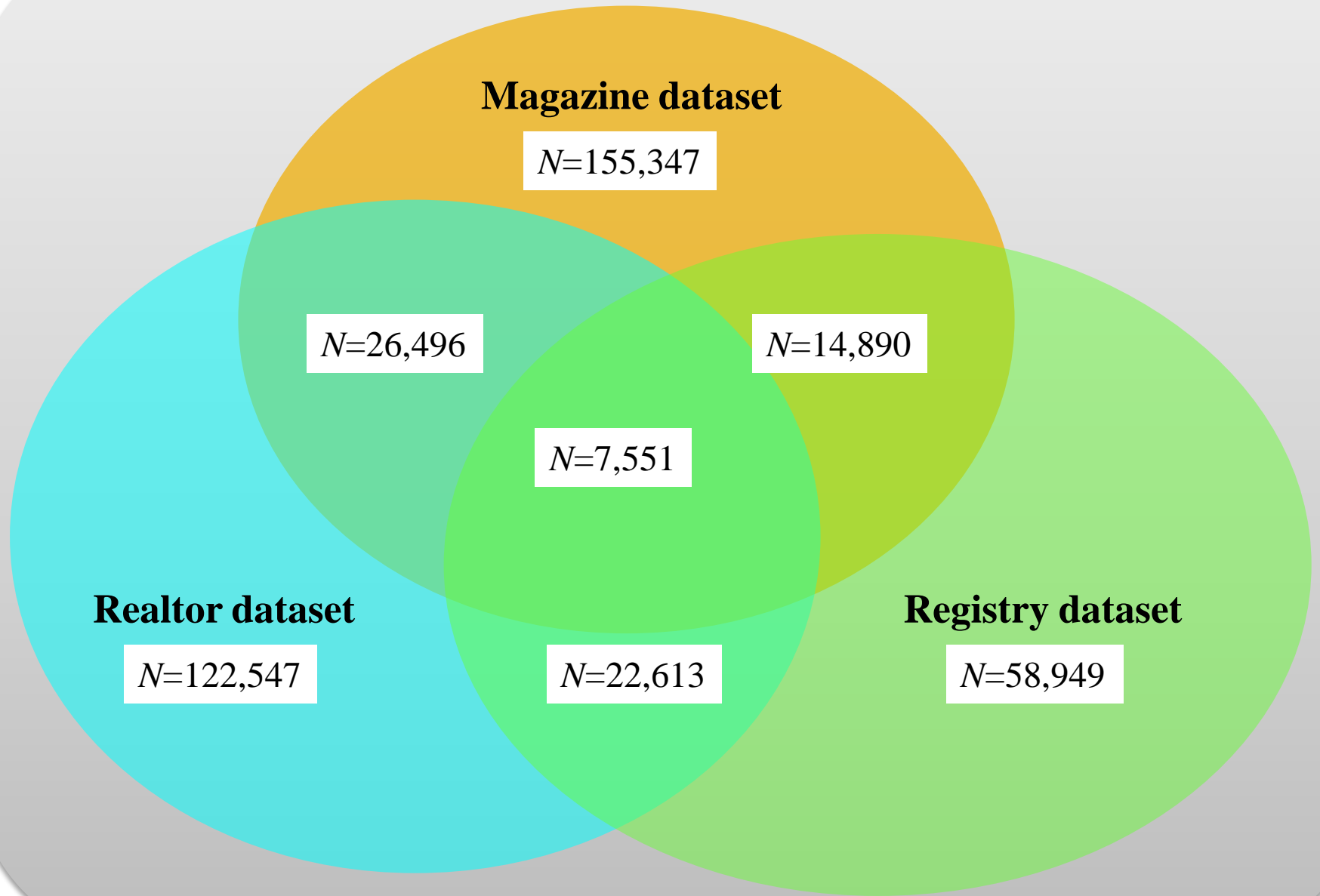
Realtor dataset

$N=122,547$

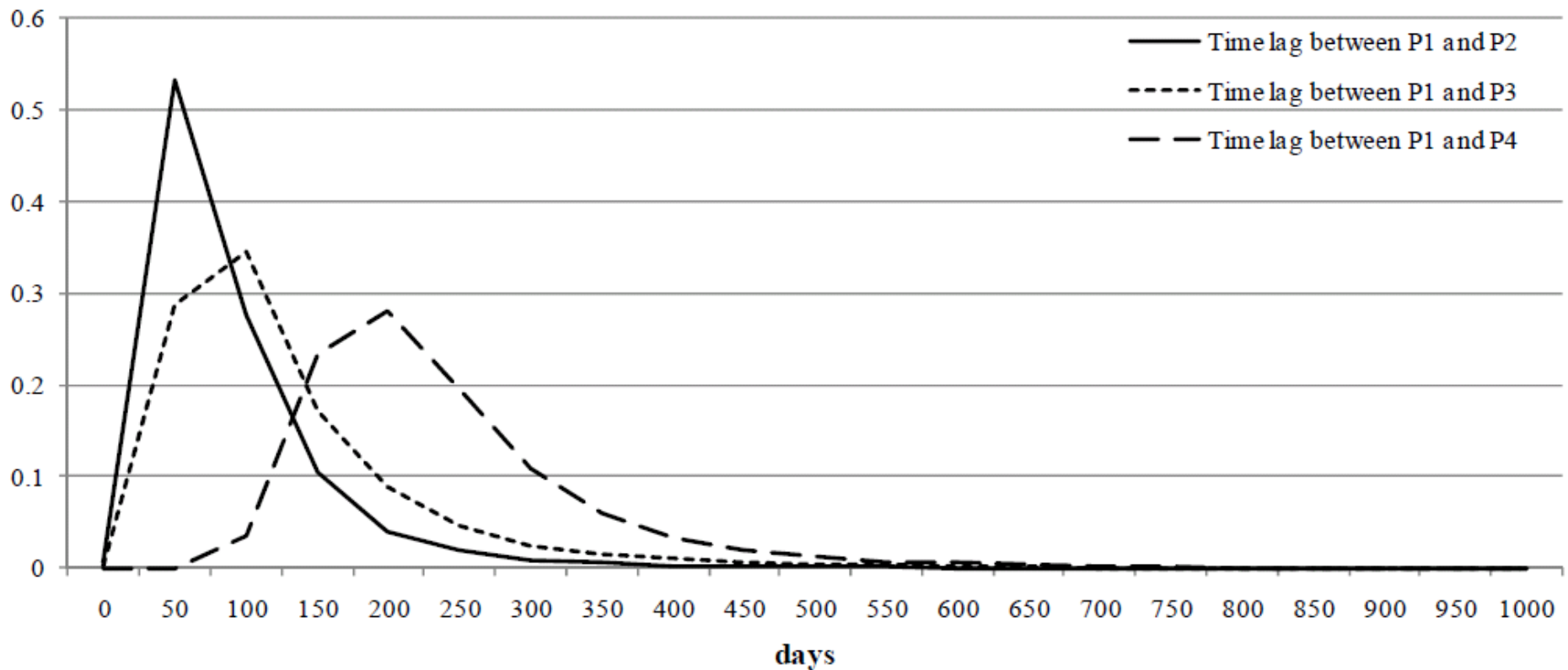
Registry dataset

$N=58,949$

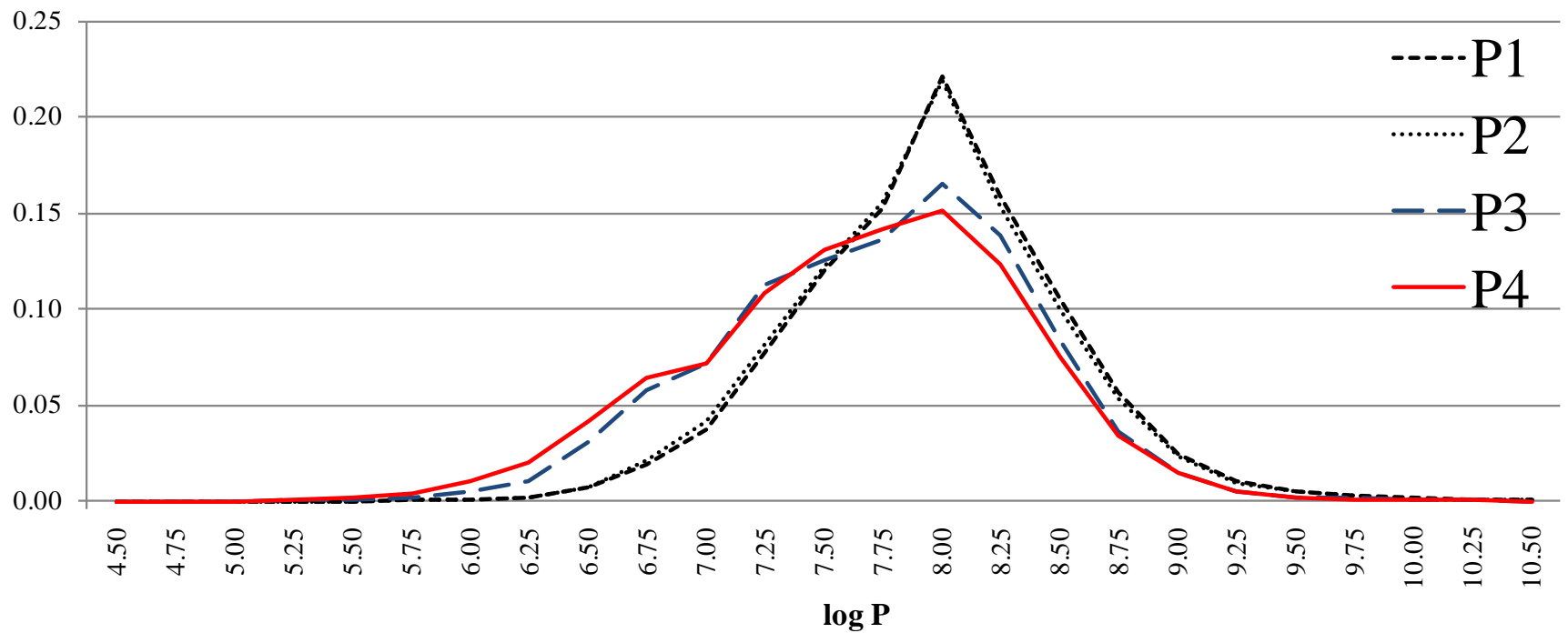
$N=22,613$



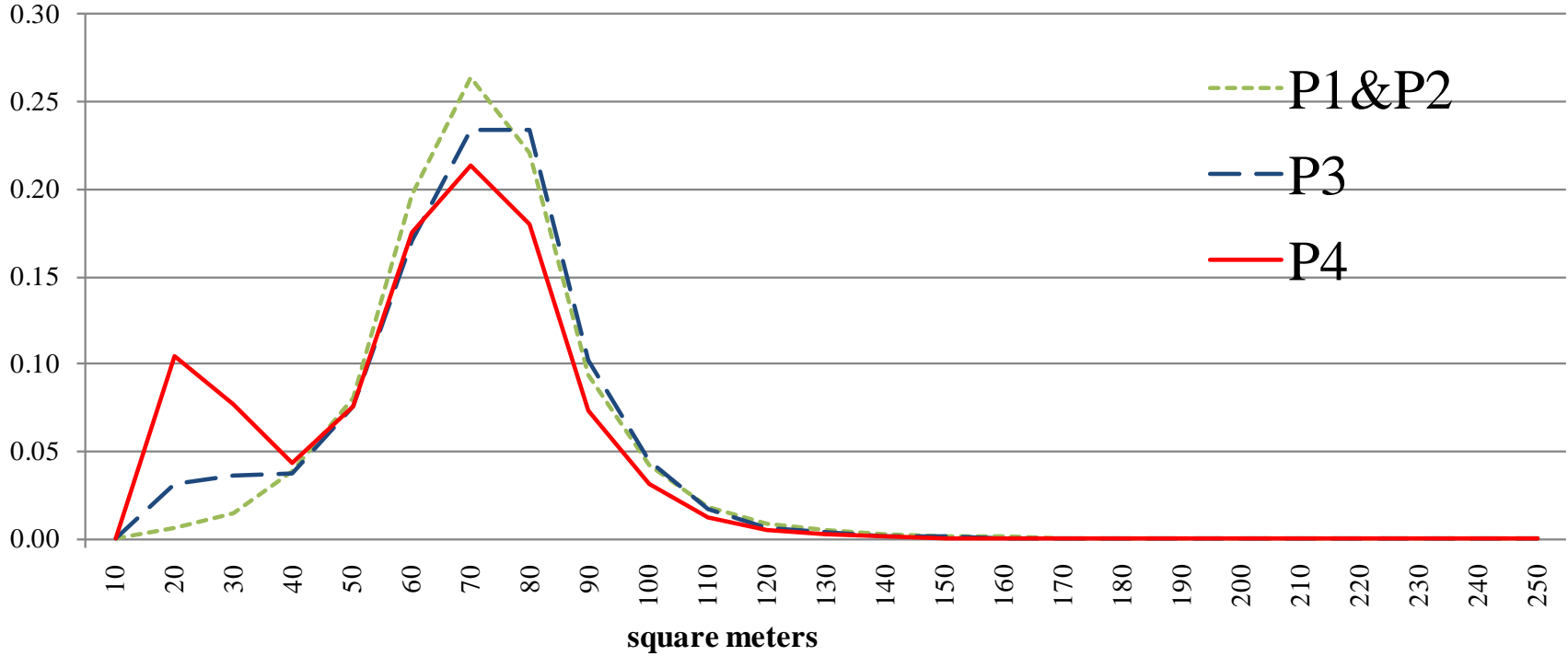
Intervals between the events in the buying/selling process



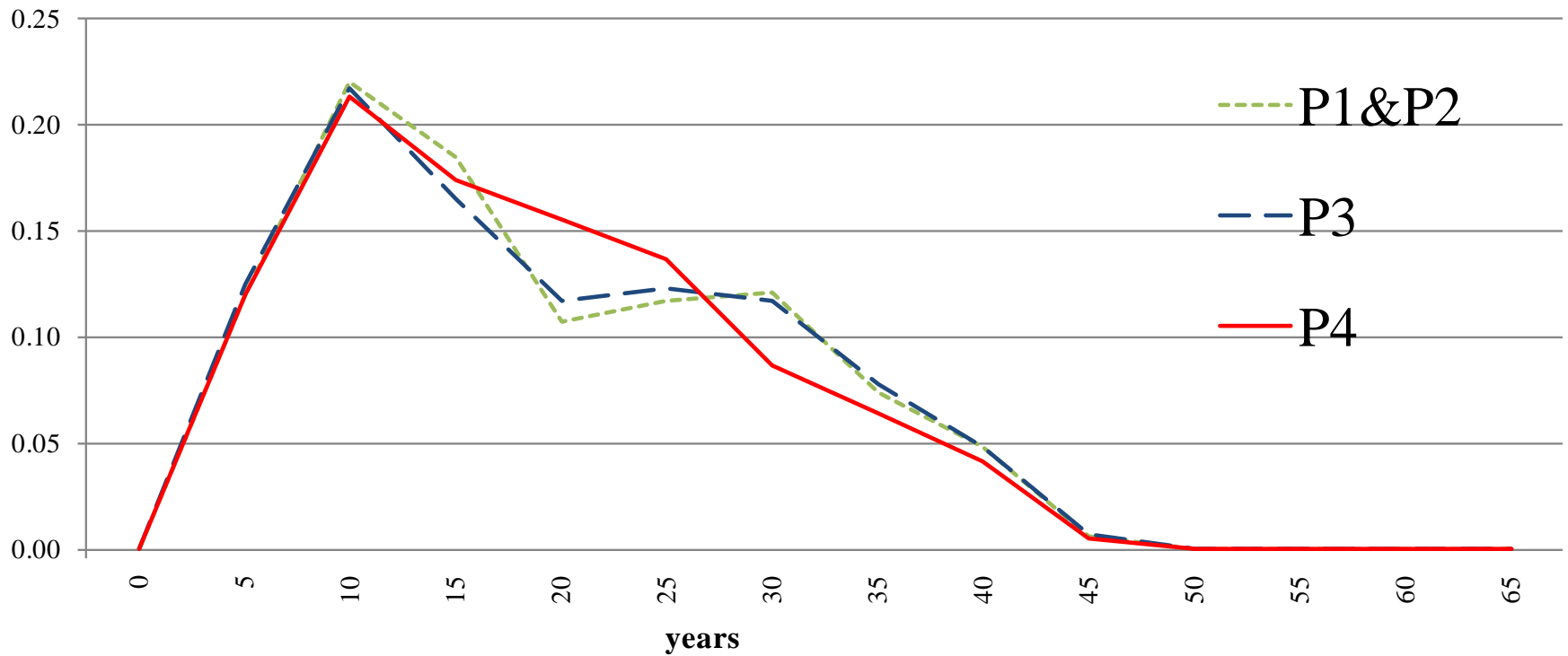
Densities for P1, P2, P3, and P4



Densities for floor spaces



Densities for ages



Two methods for quality adjustment

Intersection approach

- Using address information, we identify houses that are commonly observed in two or three datasets. Then we look at price distribution for the intersection sample.
- This idea is quite similar to the one adopted in the repeat sales method.

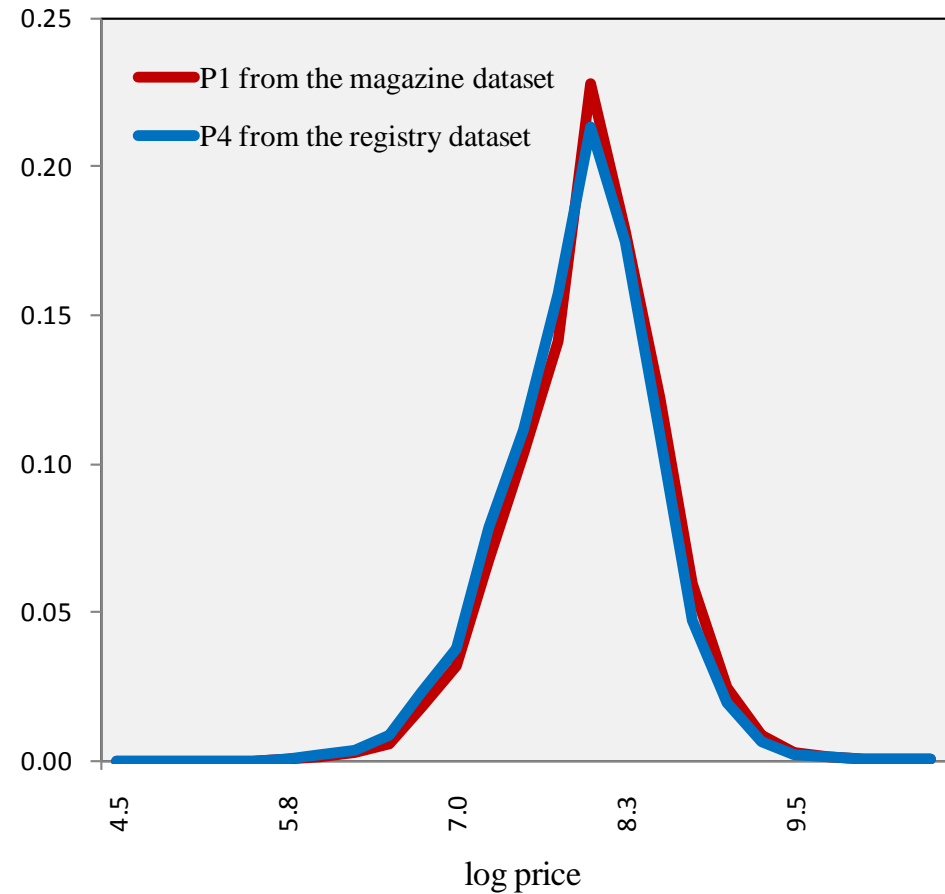
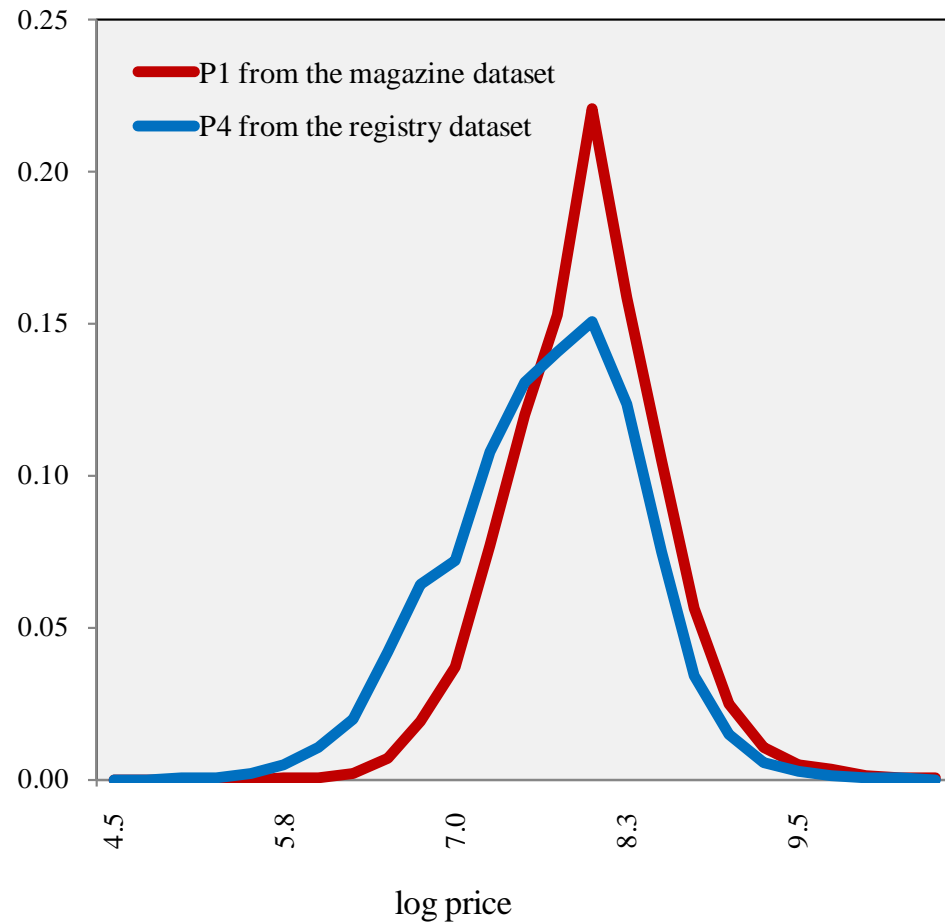
Quantile hedonic approach

- We apply quantile hedonic regression to the raw data. Then we use the estimated quantile coefficients and the distribution of various house attributes to conduct quality adjustment.
- This method is proposed by Machado and Mata (2005), and applied housing data by McMillen (2008)

Price distributions
for the raw data

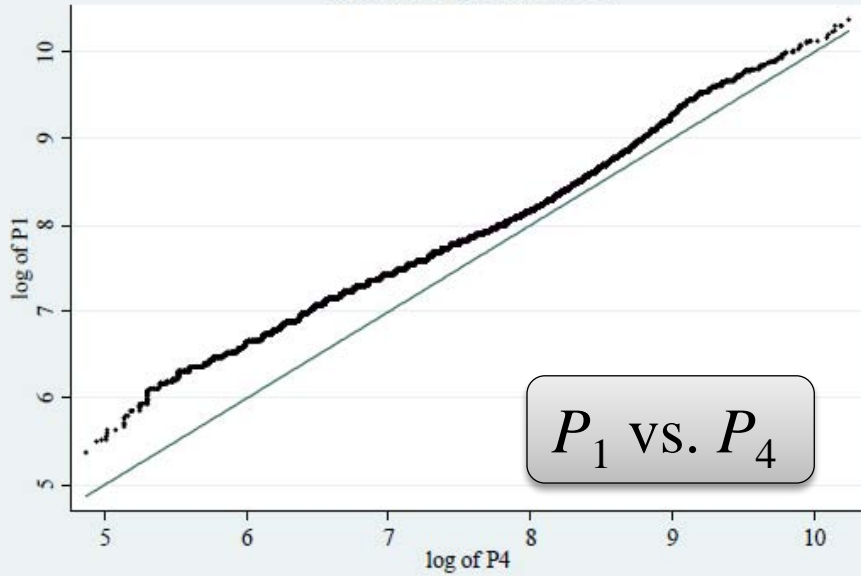


Price distributions for the quality
adjusted data by the intersection
approach

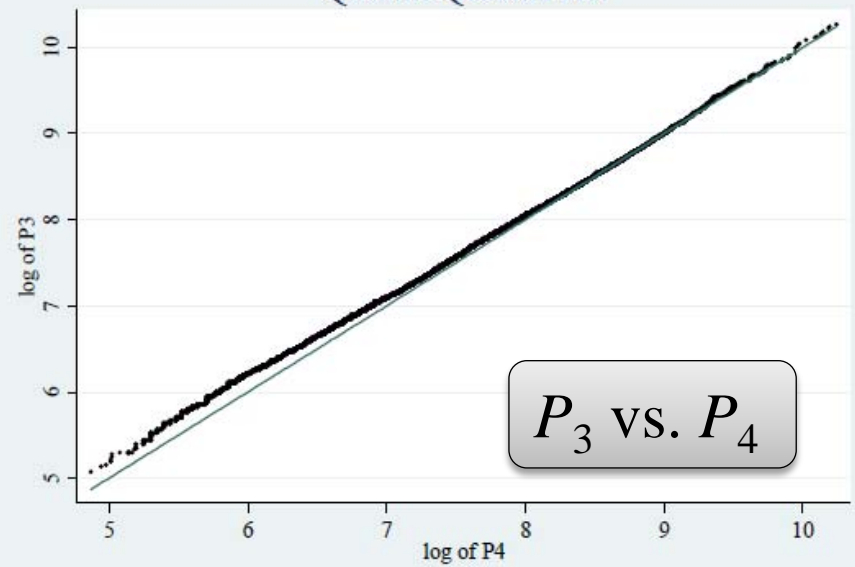


QQ plots for raw data

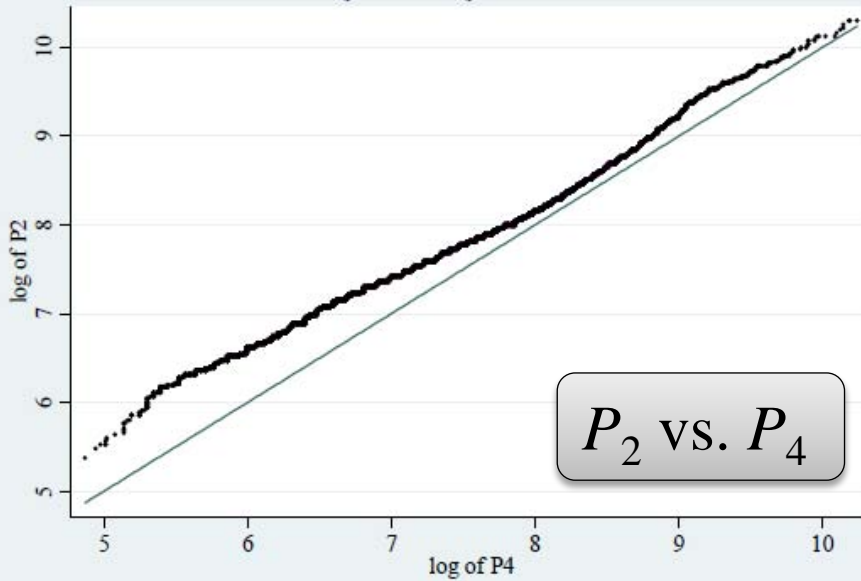
Quantile-Quantile Plot



Quantile-Quantile Plot

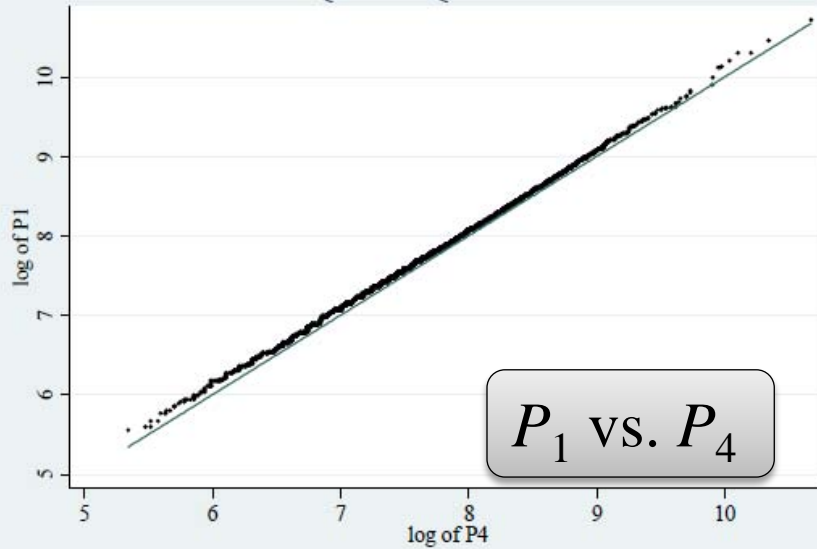


Quantile-Quantile Plot

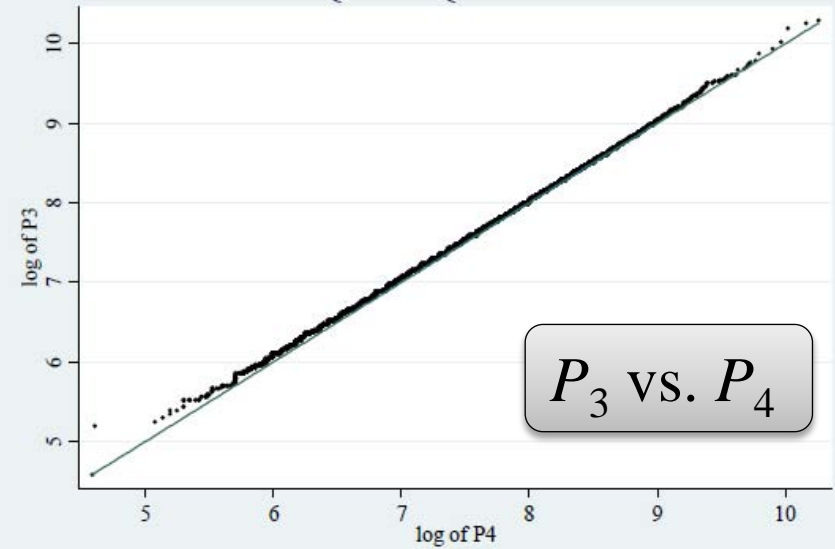


QQ plots for quality adjusted data by the intersection approach

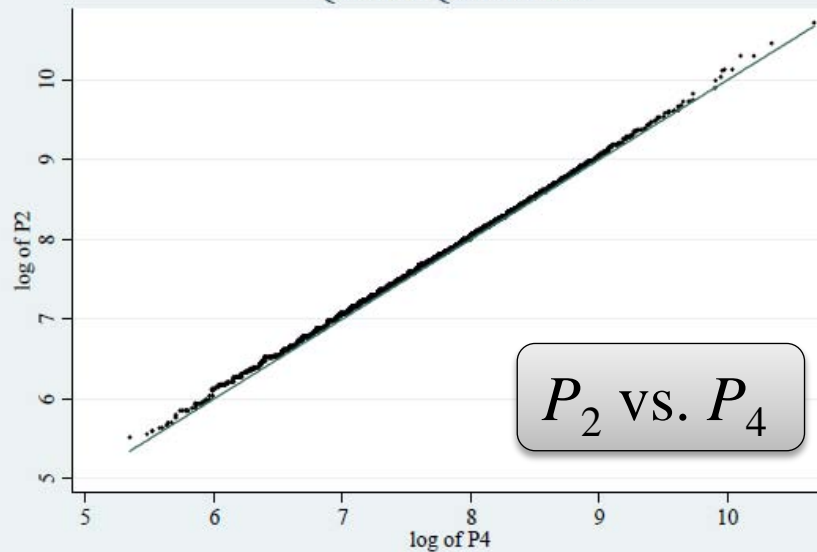
Quantile-Quantile Plot



Quantile-Quantile Plot

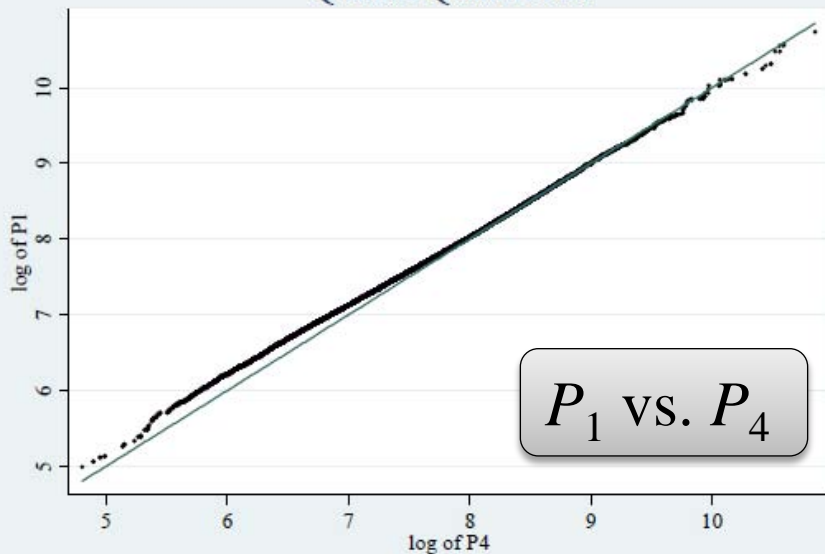


Quantile-Quantile Plot

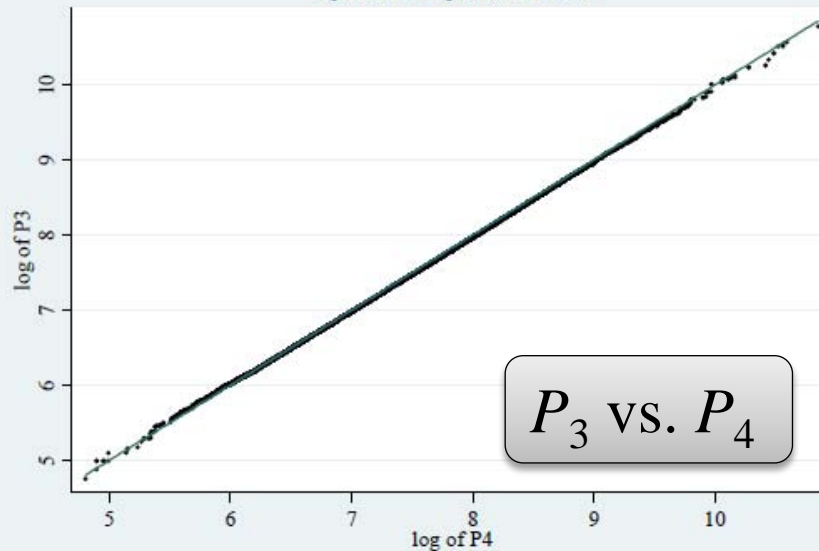


QQ plots for quality adjusted data by the quantile hedonic approach

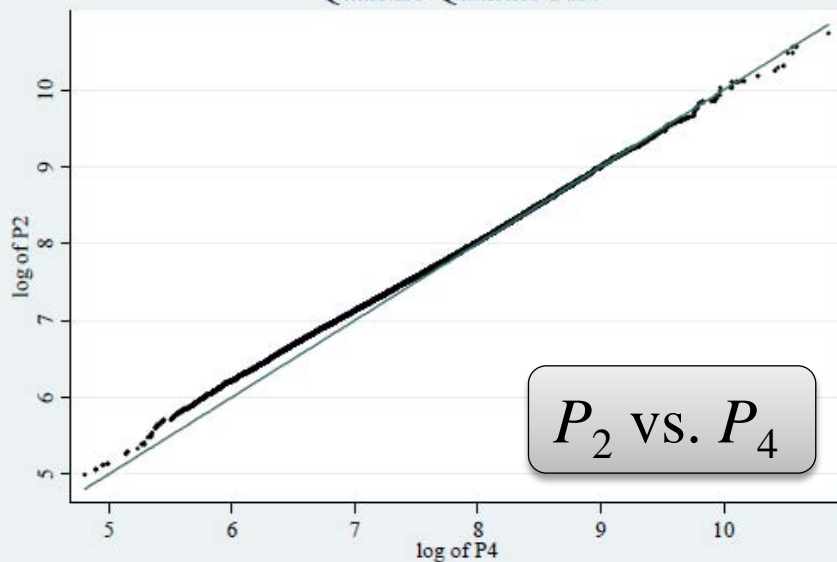
Quantile-Quantile Plot



Quantile-Quantile Plot



Quantile-Quantile Plot



Kolmogorov-Smirnov test

D-statistics

p-value

Number of observations

Raw data

P_1 vs. P_4

0.2016

0.000

155,347 for P_1 and 58,949 for P_4

P_2 vs. P_4

0.1885

0.000

155,347 for P_2 and 58,949 for P_4

P_3 vs. P_4

0.0432

0.000

122,547 for P_3 and 58,949 for P_4

Quality adjusted by the intersection approach

P_1 vs. P_4

0.0584

0.000

14,890 for P_1 and 14,890 for P_4

P_2 vs. P_4

0.0441

0.000

14,890 for P_2 and 14,890 for P_4

P_3 vs. P_4

0.0303

0.000

26,496 for P_3 and 26,496 for P_4

Quality adjusted by the quantile hedonic approach

P_1 vs. P_4

0.0676

0.000

50,000 for P_1 and 50,000 for P_4

P_2 vs. P_4

0.0535

0.000

50,000 for P_2 and 50,000 for P_4

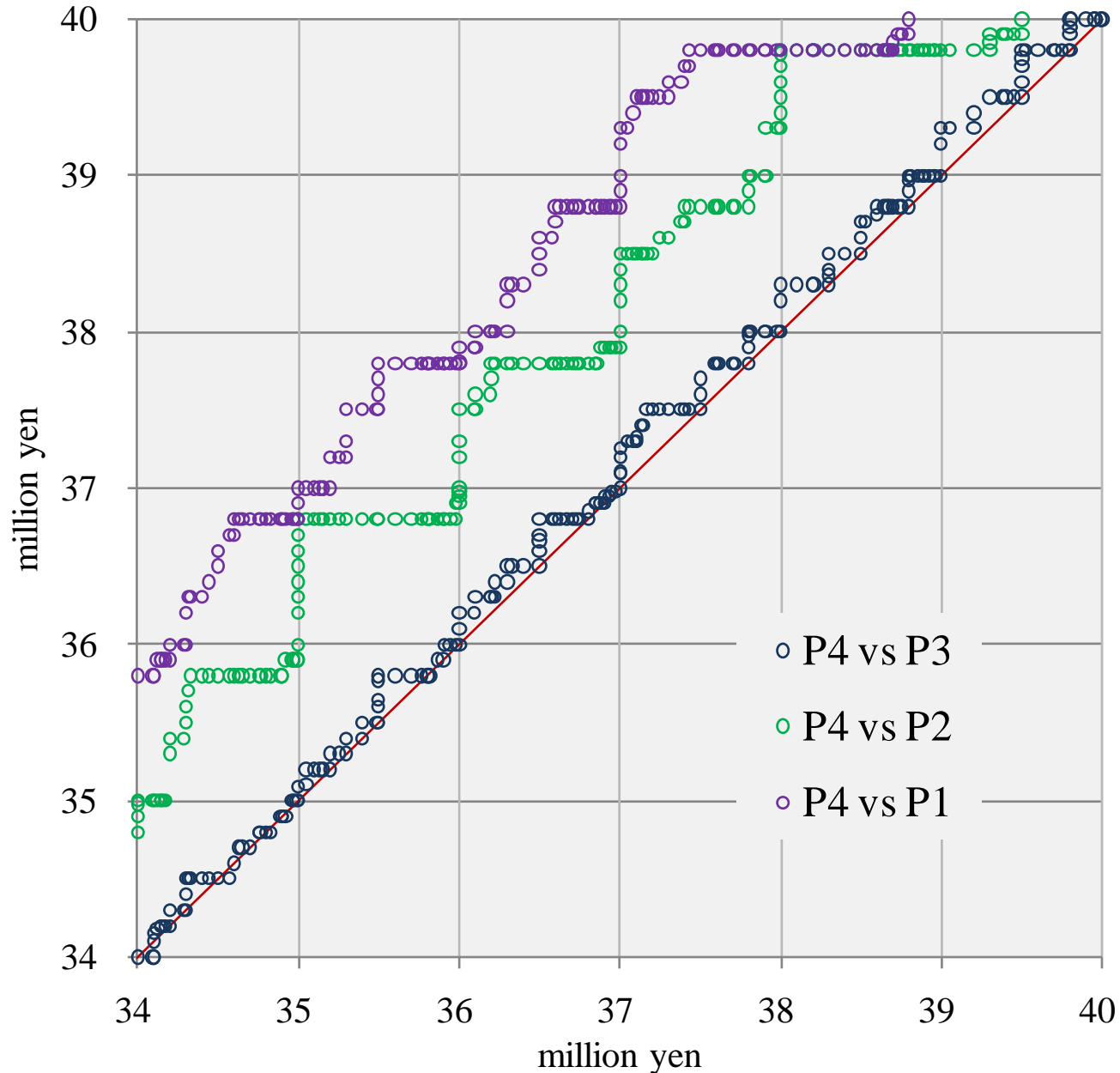
P_3 vs. P_4

0.0199

0.000

50,000 for P_3 and 50,000 for P_4

Q-Q plots for the intersection sample of the three datasets



Main findings

1. There exist substantial differences between the four distributions of prices, as well as between the distributions of house attributes.
2. However, once quality differences are eliminated, there remain only small differences between the price distributions.
3. This suggests that prices collected at different stages of the house buying/selling process are still comparable, and therefore useful in constructing a house price index, as long as they are quality adjusted in an appropriate way.