Abstract

The paper examines the effect of location in a flooding zone on property prices in the Ile de France region in France over the period 2002 to 2012. We use unique data on property transactions from a major European city exploiting the different dates of implementation of special risk zoning regulation as well as the date of implementation of compulsory information disclosure. Using an identification strategy based on a spatial difference-in-difference specification, the preliminary results indicate that once the regulatory zone (PPRi) has been prescribed, the transaction prices for flats decrease by approximately 6% in areas that are part of a PPRi at the time of the prescription. No statistically significant effect is found on house prices.

Keywords: flooding, hedonic price analysis, difference in difference estimation.
1 Introduction

Increased flood risk is one of the major consequences of climate change, and it is already a current risk for populations in some areas of Southern and Western France. In this article, we study flood-prone areas which are land areas identified by the French regulation on flood risk prevention plans (PPRi). Each flood zone describes that land area in terms of its risk of flooding. The first objective of the paper is to test whether increased flood risk, all else equal, has an impact on the price of the real estate transactions in the Ile-de-France region over the period 2002 to 2012. Several papers have measured the marginal impact of flood risk on property values but mostly with the use of a dummy variable indicating whether the property is located in a floodplain or not (Bin and Polasky 2004; Kousky 2010; Samarasinghe and Sharp 2010; Bin and Landry 2013; Atreya et al. 2013). McKenzie and Levandis (2010) include more exact measures based on the elevation over the mean sea level of the property’s location. One of the contributions of the article will be to match the property data with more precise geo-localized flood risk data. The second objective of the paper is to assess the role of information on real estate prices. A requirement to re-state publicly available information should not have any effect on real estate prices if buyers and sellers possess the same information. If sellers are better informed about flood risk, though, disclosure statements of flood risk would influence prices. To the best of our knowledge, the only related paper on this topic is Pope (2008), who evaluates the impact of asymmetric information between buyers and sellers in a hedonic price model using data from 1996 on house prices in Wake County, North Carolina. He uses a change in regulation requiring disclosure of seller information as identification strategy, together with spatial variation in areas where sellers are required to disclose flood risk information. The results
from the analysis shows that the prices decreased by around 4% for houses located in the

The literature underlines the need to develop novel methods to improve our ability to
estimate the marginal willingness to pay for environmental improvements \cite{Bento2013, Lavaine2014}. A wide range of studies on this topic use quasi-experimental techniques.

In the same vein, to mitigate selection and endogeneity problems and to infer the impact of
information on property prices, we use different dates of implementation of flood risk zones
as a quasi-experimental approach. While this is not the first difference-in-difference study
to use the effect of an environmental policy on hedonic prices as a natural experiment, this
study aims to analyze the consequences of a shift in risk perceptions on housing markets
with respect to environmental amenities. It aims to shed light on people’s willingness to pay
for perceived differences in flooding risk. The analysis of this paper focuses on municipalities
in the Ile de France region and particularly in three departments surrounding Paris, where
residents recently were concerned by the implementation of flood risk zones (PPRi), which
have also been put in place more generally on the French territory. The geographic region
for the control group is represented by transactions in locations that were not concerned
by a PPRi. House prices in PPRi areas (treatment group) are compared before and after
the PPRi designation with the nearby municipalities (control group). The conditions of
supply and demand for housing are relatively similar in both groups, so that we can expect
a similar set of implicit prices in PPRi zones and in its surroundings.

The Ile-de-France region is highly exposed to the risk of a major flood of the Seine
River. About 830 000 people and 620 000 jobs would be directly affected if a flood similar
to the historic event of 1910 would occur \cite{IAU2011, OECD2013}. Even if protection
structures (dams and reservoir lakes, floodwalls, embankments) have been constructed to limit the effects of such an event, the vulnerability of the largest metropolitan area of continental Europe has increased. This is due to the densification of the constructions in the floodplain as well as to the presence of critical infrastructure (transport, energy, communications, water) along the Seine River [OECD 2013]. That is why according to scenarios established by the OCDE, the direct damage of a 100-year flood could vary from 3 to 30 billion euros. A study by the Paris Region’s Planning and Development Agency (IAU Ile-de-France) published in 2013 shows that despite the introduction of several laws since the beginning of the 1980s controlling or even prohibiting constructions in flood prone zones, more than 100 000 dwellings have been constructed between 1980 and 2010. Furthermore, 38 000 dwellings, representing 9% of the new regional constructions, have been constructed during the last decade (2000s) in these risk areas, which represents an increase compared to the two previous decades. This occurred while most of the flood risk prevention plans were approved. Faced with this paradox, two major questions arise. First, to what extent does the French regulation on flood risk information restrain the population from moving into flood prone areas? Second, does the information provided under this regulation have an impact on the prices of real estates located near Paris where the demand is very important?

2 Regulation and objectives of the analysis

The obligation to inform citizens about identified major risks (natural or technological) was introduced by the Decree of 11 October 1990 issued pursuant to Section 21 of the Act of 22 July 1987. Since Barnier’s law of 1995, the municipalities that are concerned by one
or several natural risks identified by the decentralized government services directed by the prefects of the department have to set up “Plans for the Prevention of Foreseeable Natural Disasters” (PPRn) that are elaborated in different documents according to the natural hazard in case (flood, landslide, avalanche).

This tool identifies the legally binding risk areas that must be considered in urban planning. In the case of flooding, the flood risk prevention plans (PPRi) are progressively replacing previous regulations (Risk Exposure Plans (PER), Submersible Surface Plans (PSS) and the article R-111-3 of the French Urban planning Code) whose efficiency were limited mostly because they were difficult to implement. Once a flood risk prevention plan is prescribed or approved a specific effort must be done to inform the population. This information is produced by the mayor with the support of the prefect, and also, since 2006, by the seller or the landlord of any property located within unsafe areas identified by the PPRn.

The main obligations for the mayor are first to produce and keep at the public’s disposal documents of municipal information on major risks (Dossier d’Information Communale sur les Risques Majeurs - DICRIM). The objective of this document is to advise the population about listed major risks in the municipality and to describe existing protective measures. It can be freely consulted at the city hall. Since 2005, this document is integrated into the Municipal Safeguarding Plan (Plan Communal de Sauvegarde - PCS) that is mandatory if a PPR is applicable. The second obligation of the mayor is to organize a public meeting every other year. Third, the mayor is responsible for the display of safety instructions in public buildings at risk. Finally, since 2003, the mayor is responsible for the installation of flood marks indicating the previous flood levels. Nevertheless, these measures are likely to
be inefficient even if the mayor applies strictly the regulation. He or she has no obligation
to inform individually each household living in a zone at risk. That is why the Act of 30
July 2003 on the prevention of technological and natural risks and the repair of damage introduced a new policy to inform the population. Applied in June 2006, it states that
every buyer or new tenant of a real estate must be informed by the seller or the landlord
about the risks to which the property is exposed.¹

A first objective of the article is to test whether the Law on information disclosure has
had an impact on the extent to which risk is accounted for in the prices of real estate
transactions.² There are theoretical reasons arguing for a limited impact of flood risk on
real estate transactions ex ante. In France, the Act of 13 July 1982 on the compensation of
victims of natural disasters created a specific scheme for natural disaster compensation (the
direct material damage caused by a natural disaster, on the condition that the status of
natural catastrophe has been declared by a decree. To finance it, insured households must
pay an additional fixed-rate premium on their insurance policy (set by the government),
wherever they live in France. This scheme hence permitted to provide compensation for a
category of risks that were not included in insurance policies, and it may also have removed
part of the responsibility of the population living in risk-prone areas as floodplains, since
the additional premium is not differentiated according to location.³

¹The seller and landlord disclosure act, the “Information Acquereur Locataire” (IAL).
²The information may come too late, in fact, when the buyer or tenant have already decided on the
purchase or rental agreement. The data collected in the BIEN database do not include the pre-agreements
to conclude a real estate transaction, which would have been a means to test whether the information put
off a transaction. Hence we limit the analysis to the impact on the final price of the real estate transactions.
³In return for this compensation scheme, the government required the limitation of construction in
risk-prone areas. This is the reason for why the Risk Exposure Plans (PER) were also instituted by the
In order to identify an effect of the disclosure law, we use the classification of risk zones. Certain parts of the population may have been informed following the implementation of the PPRi flood plan. For each real estate transaction, we record the date a PPRi was prescribed or approved at the specific location. Figure ?? shows the timeline of implementation of a PPRi. We also dispose of the date at which the Document of municipal information on major risks (DICRIM) was put in place. This date marks the time at which the public is considered officially informed of the municipality’s flood risk. It is thus important to separate any direct effect on real estate transactions of a PPRi from an effect of the mandatory seller disclosure regulation implemented in 2006. In the studied area (the Ile de France region), this date is important because all the municipalities concerned by flood risk had already a PPRi, a PER, PSS or the article R-111-3 of the French Urban planning Code whose geographical borders could be slightly different from the present ones.

It is also important to underline that the borders of the risk zones do not coincide with municipal borders. Hence it is necessary to locate each transaction in the relevant area of zoning, which is what has been done for the present analysis. Previous work on the French information disclosure act studied the average price at the level of the municipality before and after the information disclosure act of 2006 (Mauroux, 2015) using 2006 data on 484 municipalities from the French provincial property price database (PERVAL). Mauroux (2015) finds little difference in average house prices in the six months preceding the Act and the six months following it, and a six percent reduction in the average price of flats situated in an area which had experienced flooding in 2005 compared to an area that had not. The coverage of the Paris database and the liquidity of the market around Paris as

\footnote{PER, PSS and areas identified by the article R-111-3 of the French Urban planning Code were considered as PPRi by law - as long as there had not yet been any review to implement a PPRi.}
well as its high level of flood risk makes it an especially relevant case to study.

3 Data and empirical strategy

3.1 Data sources

Property prices are drawn from a unique and detailed dataset - BIEN - compiled by the Chambre of Notaires (who records property transactions) for the region Ile de France. The data we use include all transactions in municipalities with a population below 10 000, and a random sample of half the transactions in municipalities with more than 10 000 inhabitants. Table 1 presents the summary statistics of the property transactions covered in the data in the Ile de France Region from 2002 to 2012. We chose to study the region around Paris at risk for flooding, i.e., the counties (départements) comprising the inner suburbs: Hauts-de-Seine (92), Seine-Saint-Denis (93) and Val-de-Marne (94). The lowest French statistical unit (below the municipality level) is the iris, and the data contain information on transactions from the 2 542 iris in the 3 counties of the inner suburbs. Out of 2 542 iris, 2 331 have never been classified in a PPRi, and 211 have been classified in a PPRi. Figure 2 shows the zones covered by a PPRi (in dark blue) and the zones that are not covered (grey) around the river Seine (in light blue).

The key variables of the BIEN dataset are the property prices, the number of floors, the number of rooms, the number of bathrooms, the number of parking spaces, the type of flat or house, the property surface, the presence of a terrace, an attic, a dependence, a

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5 Department is a French geographical level below the regional level.
6 Iris is a French geographical level below the municipality level. In total, France has 16 100 iris, of which 650 are located in overseas counties.
Figure 1: The implementation of a PPRi flood risk zone

1. Prescription of a PPRN by the prefect (representant of the national government in the department)

2. Consultation of the concerned municipalities council and competent bodies

3. Public inquiry

4. Approbation of the PPRN by the prefect

5. Annexed to the local urbanism plan (as a public servitude)

6. Obligation for the municipality to inform citizens by editing a document of information on local major risks (DICRIM - if it doesn’t yet exist) based on the departmental report transmitted by the prefect.

7. Inclusion of the DICRIM in the Municipal Safeguarding Plan document (PCS) dedicated to crisis management and the continuity of public services.
Figure 2: Map of the PPRi zoning in the Paris region

PPRI approved
- Iris not concerned
- Iris concerned

Sources: GEOFLA 2015, IGN; PPRi, DDT 75, 92, 93, 94, IAU

Antonin Pavard, 2017
pool, a tennis court or a terrace and a variable which indicates if the property is less than 5 years old. Panel A of Table I shows the average prices in 2012 price level of a property. We observe that property prices are higher in the control group than in the treated group, hinting at potential differences between both groups.

Table 1: Summary Statistics Mean(SE)

<table>
<thead>
<tr>
<th>Variables</th>
<th>entire dataset</th>
<th>Control</th>
<th>Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Prices (EUR)</td>
<td>270025.1</td>
<td>270397</td>
<td>267167</td>
</tr>
<tr>
<td>in 2012 price level</td>
<td>219636.7</td>
<td>221578.4</td>
<td>204083.5</td>
</tr>
<tr>
<td>A. Dependent variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ_house</td>
<td>.1933686 (.3949402)</td>
<td>.1967764 (.3975627)</td>
<td>.1671853 (.3731472)</td>
</tr>
<tr>
<td>private_buyer</td>
<td>.4584523 (.4982717)</td>
<td>.4590912 (.4983247)</td>
<td>.4535438 (.497845)</td>
</tr>
<tr>
<td>garden</td>
<td>.2182829 (.4130813)</td>
<td>.2219577 (.4155637)</td>
<td>.1900483 (.3923453)</td>
</tr>
<tr>
<td>pool</td>
<td>.0010715 (.0327158)</td>
<td>.0010869 (.0329508)</td>
<td>.0009526 (.0308504)</td>
</tr>
<tr>
<td>terrace</td>
<td>.0736971 (.2612779)</td>
<td>.0736346 (.2611759)</td>
<td>.0741776 (.2620638)</td>
</tr>
<tr>
<td>less5years</td>
<td>.0826638 (.2753739)</td>
<td>.0822185 (.2746979)</td>
<td>.0860854 (.2804945)</td>
</tr>
<tr>
<td>room_nb</td>
<td>3.10481 (1.474001)</td>
<td>3.112627 (1.479343)</td>
<td>3.044765 (1.430894)</td>
</tr>
<tr>
<td>surfhabdec</td>
<td>61.88695 (32.27663)</td>
<td>62.06149 (32.47837)</td>
<td>60.58023 (30.69339)</td>
</tr>
<tr>
<td>nbrsaldb</td>
<td>1.129338 (.4234147)</td>
<td>1.130042 (.4240888)</td>
<td>1.123844 (.4180865)</td>
</tr>
<tr>
<td>growarage</td>
<td>.6602951 (.6525368)</td>
<td>.6615652 (.6515984)</td>
<td>.650528 (.6596374)</td>
</tr>
<tr>
<td>attic</td>
<td>.6572496 (.5479639)</td>
<td>.6594409 (.5477331)</td>
<td>.640103 (.5494157)</td>
</tr>
<tr>
<td>dependence</td>
<td>.0122286 (.109905)</td>
<td>.0124233 (.1107655)</td>
<td>.0107329 (.1030438)</td>
</tr>
<tr>
<td>niveau</td>
<td>1.935273 (.635456)</td>
<td>1.929992 (.6346643)</td>
<td>1.983009 (.6406579)</td>
</tr>
<tr>
<td>floor (flat)</td>
<td>2.62854 (2.518323)</td>
<td>2.597569 (2.480625)</td>
<td>2.859022 (2.77207)</td>
</tr>
</tbody>
</table>

Note: Reported values are means with standard deviations in brackets. The time period covered in the analysis is 2002-2012, and the unit of analysis is the transaction -year. ‘Treated’ is defined as a transaction in a PPRi, and ‘control’ are transactions with a location without a PPRi.

3.2 Empirical Methodology

The objective of the paper is to assess the impact of the implementation of the flood risk zoning (PPRi) on property prices. We estimate difference in difference models to exploit the different dates of implementation of the PPRi zones. These zones do not always correspond
exactly to the borders of a municipality. For every real estate transaction we know its location in latitude and longitude and have matched the exact location in its relevant zone using GIS shape files of the regulatory zones. The database thus constructed is unique in giving the exact location of each transaction in or outside of a regulatory flood risk zone. Housing prices are compared before and after these dates of implementation of a PPRi with nearby zones without PPRi acting as a control group. We implement this by estimating the following equation:

\[ Y_{t_iy} = \beta_{PPRI}t_i \ast post_y \ast \delta X_{t_iy} + \sigma_y + \alpha_i + \epsilon_{t_iy} \] (1)

where \( Y \) is the log of property prices of the transaction \( t \) in iris \( i \) at year \( y \). Turning to the independent variables, \( post \) is an indicator variable for the year of the implementation of the flood risk zone. Different dates of change are considered; there exists a date of PPRi information release, a date of PPRi prescription, a date of PPRi approbation, and a date of a survey, as explained in Section 2. In addition, \( PPRI \) is an indicator variable equal to one if the property is classified in a PPRi zone, and equal to zero otherwise. \( \beta \) is the difference-in-difference parameter. \( X_{t_iy} \) is a vector of property controls that includes the surface of the property, the surface of the main room, the number of rooms, the number of floors, the number of bathrooms, the number of parking spaces, the presence of an attic or a dependence, and a variable which indicates if the property is less than 5 years old. It also differentiates between specific attributes for houses and flats, such as the type of house and the presence of a pool, a tennis and a terrace or the type of flat and the number of floors.

Property characteristics are added to control for any differences in the evolution of property characteristics between the treatment and the control group. We also control for temporal patterns by including year dummies in \( \sigma_y \). Because many properties were sold repeatedly during the sample period it is possible to control for unobserved characteristics at the iris level. Thus, we include iris fixed effects (\( \alpha_i \)) to control for time-invariant characteristics of the municipality. \( \epsilon_{iy} \) represents the error term, which consists of an idiosyncratic component and a term clustered on the iris and year.

As with any difference-in-difference design, the key underlying assumption for identification is that the control group serves as a valid counterfactual for the treatment group with parallel trends. Although we cannot explicitly verify this assumption, we feel this threat is limited in this setting for several reasons. First, Figure shows a similar evolution of prices in both groups before a PPRI has been prescribed. Furthermore, we vary the definition of treatment to test the robustness of our results in the next section. Because a PPRI could be anticipated, we also could expect sorting of households according to preferences prior to PPRI. We use different definitions of treatment in the following section in order to take anticipation effects into account. The change in the number of transactions may also matter before and after information disclosure. One concern with the analysis is that information can affect the number of property transactions, potentially leading to sample selection bias. The number of transactions is smaller (14,250) across the flooding areas than in non-flooding areas (109,214) before seller’s disclosure and after seller’s disclosure (17,242 versus 132,751). The number of transactions, though, have increased in both groups.

8The iris is the smallest statistical unit in French statistics and a municipality contains several iris, which can be approximated as neighbourhood blocks.

9We cluster on the iris because this is the smallest geographical French statistical unit, and on the year since this is the unit of measurement for the price. This yields a total of 27,962 clusters (2,542 iris*11 years). By clustering on the iris we are also accounting for potential serial correlation within an iris.
4 Results

As a first look at the impact of location in a PPRi we present the results from a simple hedonic price estimation on the pooled data in Table 2 (without presenting the details of the coefficients on property characteristics). No significant impact of location in a PPRi can be detected, neither on the full sample, nor on the subsamples of flats and houses.

Table 2: First test: standard hedonic price analysis on the pooled data

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Flats</th>
<th>Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>PPRI</td>
<td>0.002</td>
<td>0.001</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Housing characteristics controls</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Iris FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>N</td>
<td>179,579</td>
<td>159,038</td>
<td>16,558</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.898</td>
<td>0.917</td>
<td>0.910</td>
</tr>
</tbody>
</table>

The dependent variable is the log of property prices in constant prices.
Note: Standard errors (in parenthesis) are clustered at the year and iris level.
Statistical significance is denoted by: *$p < 0.10$, **$p < 0.05$, ***$p < 0.001$.

Table 3 presents the results from the difference-in-difference specification in Equation 1. We test several potential dates of information disclosure to the public, following the timeline of implementation of the flood risk zones shown in Figure 1. Each column corresponds to a different date of the treatment variable, in order: the date of prescription of a PPRi (column 1), the date of its approval (column 2), and the date of the municipal official documents (column 3). The preliminary estimation results in Table 3 indicate a 5.9% decrease in the transaction price from designation in a flood risk zone, by the prescription date of the flood risk zone. No statistically significant effect is found from the other dates of implementation of the treatment, that is, only the first date of implementation of the
flood risk zone has a significant effect on the real estate transactions. In the same table, column (4), we also test for an effect post the disclosure Act of 2006, but find no effect on the transaction price. This is compatible with the fact that already the prescription of a flood risk zone (the prescription date used as treatment in column 1) implies application of the seller disclosure Act.

Table 3: Treatment effects according to dates of implementation of the flood risk zones

<table>
<thead>
<tr>
<th></th>
<th>Full sample (houses and flats)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescription date</td>
<td>Approbation date</td>
<td>DICRIM date</td>
<td>IAL</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>$PPRI \ast post$</td>
<td>-0.059***</td>
<td>-0.007</td>
<td>-0.009</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.008)</td>
<td>(0.010)</td>
<td>(0.008)</td>
</tr>
</tbody>
</table>

Housing characteristics controls YES YES YES YES
Iris FE YES YES YES YES
Year FE YES YES YES YES
N 179,579 179,579 179,579 179,579
$R^2$ 0.898 0.898 0.898 0.898

The dependent variable is the log of property prices in constant prices.
Note: Standard errors (in parenthesis) are clustered at the year and iris level.
Statistical significance is denoted by: $p < 0.10$, $**p < 0.05$, $***p < 0.001$.

In Table 4 we separate the effect on the two different sub markets of flats and houses, presenting only the treatment of the date of prescription of a PPRi, for which an effect was found on the full sample of transactions. The effect of designation in a flood risk zone decreases the transaction price of flats by 5.6 % but has no statistically significant effect on the price of houses.
Table 4: Treatment effects on submarkets

<table>
<thead>
<tr>
<th></th>
<th>Flats</th>
<th>Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>$PPRI \times post$</td>
<td>-0.056***</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>Housing characteristics controls</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Iris FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>N</td>
<td>159,038</td>
<td>16,558</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.917</td>
<td>0.910</td>
</tr>
</tbody>
</table>

The dependent variable is the log of property prices in constant prices.
Note: Standard errors (in parenthesis) are clustered at the year and iris level. Statistical significance is denoted by: $^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.001$.

5 Conclusions and extensions

We use a difference-in-difference approach based on different dates of implementation of flood risk zones around Paris to identify the impact of flood risk on real estate transactions in the largest metropolitan area in Europe. The data we use is unique in matching each transaction with its exact location within a flood zone or not, and with the date of the implementation of the flood zone. The analysis is undertaken on the transaction level controlling for a wide set of property characteristics. Preliminary estimation results indicate that the treatment of being designated within a flood risk zone decreases the average transaction price by 5.9%. The results show a different impact according to submarkets, with a decrease in the prices of flats by 5.6% and no significant effect on house prices.

In the paper we used the regulatory flood risk areas to identify the zones at risk. Future work will separate the impact of the regulatory flood risk zoning with previous experience of floods (using the height of the last flood) and include measures of the distance to the watercourse. A priori, the ex ante hypothesis that could then be tested is that location in a flood prone area may increase property values in zones with no previous flood experience.
Figure 3: Adjusted yearly price level since a PPRi has been prescribed by PPRi areas

Note: Prices levels are adjusted by property characteristics, year dummy variables and iris characteristics (FE). 'properties with PPRi' (dashed line) are properties classified in a PPRi since it has been prescribed, and 'properties without PPRi' (darker line) are properties not classified with a PPRi.

and decrease them in zones with recent flood experience. Casual evidence of this stems from the popularity of constructions of buildings in areas with views over the water (near the Thames or the Seine, for example). The amenity effect of a water view can be separated from the flood risk effect if the data allow us to study repeat sales of the same property, as the data used here do. The use of a long time series also enables us to test whether any discount in the property price decreases over time, as found in Atreya et al. (2013). All these tasks constitute work in progress to be integrated into the final paper.
References


McKenzie, R. and J. Levandis (2010). Flood hazards and urban housing markets: The

