**Research Proposal: Homebuyers’ Attention Towards Environmental Pollution Disclosure**

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# Introduction

Mandatory information disclosure, or targeted transparency, has been widely advocated by both regulators and researchers as an appealing alternative to “harder” or more restrictive forms of regulation (Sunstein 1999). In ideal scenarios, information disclosure can help to prevent misaligned incentives and asymmetric information between the demand side and the supply side, while being cost-effective and maintaining the consumer’s freedom of choice (Loewenstein et al. 2014).

However, the effectiveness of information disclosure mechanisms can be significantly challenged by the consumer’s lack of attention. There is a large and growing literature demonstrating that consumers are prone to making mistakes even if the information is readily available and easy to access, across various aspects such as in choosing optimal options for pension funds (Choi et al. 2011), buying food and beverages (Bollinger et al. 2011) or stock investing (Hirshleifer et al. 2009). In light of the current “information explosion”, attention is a scarce economic resource which requires people's efforts to allocate. Hence, it is unsurprising to witness individuals’ lack of attention and their resulting misconceptions (Loewenstein et al. 2014).

In this research, I aim to further examine the issue of information disclosure policy and the attention of information recipients, by looking at the impact of disclosed information about local environmental quality on the housing market. There are two reasons why this is pivotal: First, there are few studies on attention and information disclosure related to economic transactions that are high-stakes and infrequent such as in the housing market. Second, local pollution is one of the most important characteristics in the homebuyers’ hedonic vectors; and it can potentially be generalised for households’ perception of other types of long-term risk.

An extensive amount of literature has investigated the impact of industrial pollution on housing prices and found mixed evidence (Lindell and Earle 1983; Kohlhase 1991; Bui and Mayer 2003; Mastromonaco 2015). However, most research on this topic overlooks the moderating effect of attention, possibly due to the infrequent and elongated nature of home-buying decisions, making measuring attention challenging. Nonetheless, one issue remains clear: if people pay limited attention to the disclosed pollution information, they might not adequately consider the environmental risks in their decision-making, henceforth weakening any findings. For example, a news article[[1]](#footnote-1) highlighted that many people residing near Love Canal – the site of one of the worst toxic waste catastrophes in the U.S. - were unaware of the environmental conditions of the neighbourhoods before purchasing their properties.

In summary, the aim of this research is to (1) discover how attention can alter the empirical findings in research related to individuals’ risk perceptions and following decisions; and (2) propose a proxy measurement for attention and test for its effectiveness.

# Proposed Theoretical Model

## Risk perception function

I first formulate the individuals’ perceptions of the environmental risks arising from industrial sites based on Gayer et al. (2000) and (Viscusi 1985). Assume that individuals have a prior perception of environmental risks about the industrial sites. Through a Bayesian learning process, they update their prior beliefs based on disclosed information provided by the official environmental agency (in this case, the Environmental Protection Agency - EPA). Note that, the diffusion of information from the EPA within the local market through various channels can influence individuals’ perceptions even among those who have not read EPA documents. Subsequently, individuals have a risk perception expressed as:

With is the prior probability about the environmental risks associated with industrial sites, based on the information content of ; while is the true risk probability implied by the information content from the EPA. By denoting the fraction of each information source over the total information content as

the risk perception in formula (1) can be rewritten into:

Function (2) means that individuals’ risk perception is a weighted average of the “informed” risk probability and their prior beliefs, with the weight depending on the relative amount of information they get from each source.

## Empirical specification with hedonic price model

The above risk perception function can be plugged into the hedonic pricing model for property. The hedonic model is characterised by Structural variables (e.g., number of bedrooms, property type), Neighborhood variables (e.g., local amenities, socio-economic conditions) and Environmental Risk perception, which takes the following specification:

Which can be rewritten into

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## Theoretical model refinement with attention

One key assumption in the theoretical function of risk perception in [2.1] is that people can form and update their perception, or their belief, seamlessly from the disclosed information. This is not necessarily true, as discussed in the above section. Gabaix (2019) suggests that behavioural individuals actually maximise the “attention-augmented decision utility”. That is, for the above function, the subjectively perceived risk attribute of the industrial site is:

where is the attention to environmental risks from the industrial site. When , the individual does not think about the risk, and makes decisions based on their prior belief. When m = 1, the individual pays full attention to the problem and perceives the true risk of the industrial site.

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# Proposed empirical research direction

## Data collection

## Industrial pollution

My research will concentrate on the Toxic Release Inventory in the U.S., a database reporting location and the amount of environmental contamination of industrial facilities in the U.S. This database serves as a comprehensive, publicly accessible repository that provides information on the release, management, and disposal of toxic chemicals by industrial facilities. There are two features which make the Toxic Release Inventory desirable: (1) it is among the richest public data sources in the world on industrial pollution, with nearly 30 years of reported data, and importantly, (2) it has a wide presence in the media – the primary source of information for households.

## Housing data

For housing price data, I will use the U.S. Home Mortgage Disclosure Act (HMDA) dataset. The HMDA dataset is publicly available and provides important information on property location, property price, loan value and the originated mortgage interest rate. More importantly, each property in HMDA has a census tract, which can be mapped using GIS to measure the neighborhood demographics and amenities.

However, as the HMDA dataset provides limited information on the property characteristics, I will also consider the use of data from property listings website such as Zillow. Another advantage of Zillow is that they store user-engagement data on their website, which can help to

## Attention measurement

One key challenge to my research is the measurement of attention. Oftentimes, attention is measured using survey or process-tracking methods (e.g., Mouselab or eye-tracking) (Gabaix 2019). These physiological methods can be highly accurate, yet they usually require costly resources and perhaps are not useful to measure attention over a long period (months to years). Researchers in finance have instead proposed using other proxy measurements, internet search frequencies (Da et al. 2011) or users’ engagement data from trading platforms (Barber et al. 2022) to measure the attention of investors, but mostly with liquid assets such as stocks, or more recently, cryptocurrency. For highly illiquid assets as property, it might require more complex and aggregated methods to measure buyers’ attention over a long period of time. Bui & Mayer (2003) highlight the importance of media as households’ primary source of information, instead of the raw data releases of the Toxic Release Inventory.

In this research, I propose a combined measurement: news reports counting (for both local and major newspapers) and Google Search query interest.

## Proposed research design

*First,* to measure the impact

The change of interest in Local newspapers and Google searches might be representative of the attention of residents. However, the change in time can only be shown through the relative attention of

The difference in how local newspapers, both online and offline, from 2 different states can represent the collective attention of local residents in the state.

## Other proposed research directions

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