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On the welfare cost of rare housing disasters



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ABSTRACT

This paper examines the welfare cost of rare housing disasters characterized by large drops in house prices. I construct an OLG general equilibrium model with recursive preferences and housing disaster shocks. The likelihood and magnitude of housing disasters are inferred from historical housing market experiences in the OECD. The model shows that despite the rarity of housing disasters, Canadian households would willingly give up 6 percent of their non-housing consumption each year to eliminate the housing disaster risk. The welfare evaluation of this risk, however, varies considerably across age groups. The risk translates into a welfare loss of as much as 16 percent of annual non-housing consumption for the old, but a welfare gain of 2 percent for the young. This asymmetry stems from the fact that, compared to the old, younger households suffer less from house price declines in disaster periods, due to smaller holdings of housing assets, and benefit from lower house prices in normal periods, due to the negative price effect of disaster risk.

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1. Introduction

Since the early 2000s, house prices have increased significantly in Canada as shown in Fig. 1.¹ This ongoing housing boom has become an important consideration for the conduct of monetary policy and financial regulation,² as currently high levels of house prices are potentially increasing the risk of a large housing market correction, which could have a devastating impact on the macroeconomy as recently seen in the United States. This paper investigates the likelihood and magnitude of housing market disasters, defined as large drops in house prices, and the value of limiting this disaster risk for the Canadian economy. I find that although housing market disasters are rare events from a statistical perspective, their macroeconomic effects are so large that they have significant welfare implications.

Estimating the likelihood and magnitude of housing market disasters is difficult because those disasters are infrequent and house price series are short for many countries. To address the data scarcity problem, this paper adopts a method similar in spirit to Barro (2006) by using cross-country housing market experiences in the OECD.³ In particular, I use house

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¹ House prices for Canada and the United States are sourced from the Teranet-National Bank 11-City Composite House Price Index and the S&P/Case-Shiller 20-City Composite Home Price Index, respectively.

² Canadian household debt, of which mortgage debt constitutes about 80 percent, has increased by more than 60 percent relative to the household disposable income during the period from 2000 to 2012.

³ Barro (2006) estimates the statistical properties of income disasters in the OECD as those experienced in the Great Depression and two World Wars. The author finds that an income disaster, defined as cumulative peak-to-trough declines in real per capita GDP of 15 percent or more, occurs with a probability of 2 percent per year with contractions in per capita GDP ranging between 15 and 64 percent.

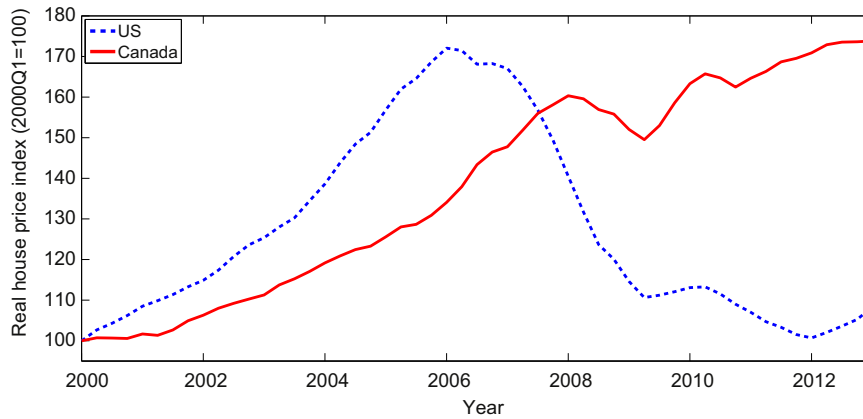


Fig. 1. House price dynamics since 2000.

price data for 20 OECD countries reported in the property prices statistics by the Bank for International Settlements with appropriate inflation adjustments. The paper defines a housing market disaster as cumulative peak-to-trough declines in real house prices of 20 percent or more. I find that in a given OECD country, housing market disasters occur with a probability of 3 percent every year, corresponding to about one disaster every 34 years. A housing disaster on average lasts about 6.4 years, and house price declines range between 24 and 68 percent with an average of about 34 percent.

To quantify both the aggregate and distributional welfare impact of this housing disaster risk, I construct an overlapping generations (OLG) general equilibrium model with recursive preferences and housing disaster shocks. The model economy is populated by overlapping generations of households, a representative firm, and a government. Households have Epstein–Zin preferences over consumption goods and housing services. The firm rents capital and employs labor to produce a numeraire good used for both consumption and investment. Households trade a one-period bond in the financial market and a durable housing asset in the housing market. Houses are lumpy and have the triple roles of consumption good, saving asset, and borrowing collateral. Households obtain their housing services by either owning houses directly or renting from landlords. Homeowners are subject to a rare housing disaster risk modeled as housing depreciation shocks similar to [Iacoviello and Pavan \(2013\)](#). I calibrate the parameters characterizing the likelihood and magnitude of housing disasters using the historical OECD house price data, and the rest to match the Canadian data over the period 2000–2012. The welfare cost associated with the housing disaster risk is measured as the percentage change in the consumption of non-housing goods households would willingly give up in an otherwise identical no-disaster economy in order to be as well off as living in the benchmark economy.

There are two major findings from the model. The first one is that despite their rarity, the aggregate welfare cost of housing market disasters is large, as Canadian households would accept to give up around 6 percent of their non-housing consumption each year to eliminate the housing disaster risk. Compared to the no-disaster economy, the presence of this disaster risk affects welfare through two channels. On the one hand, it introduces large negative wealth effects in disaster periods, due to a collapse in house prices (1st channel). The losses in housing wealth reduce the aggregate household savings and thus the capital supply, with the resulting decreases in investment leading to declines in wages and output. On the other hand, the disaster risk also distorts the life-cycle consumption and portfolio behavior of households in normal periods (2nd channel). When risk-averse households anticipate possible large declines in house prices in the future, they become more willing to save in financial assets than in the no-disaster economy. This portfolio reallocation lowers both house prices and the interest rate. Declining borrowing costs then leads to higher investment, output, and consumption. Which of the above two channels is the main source of the welfare cost of the housing disaster risk? To address this question, I conduct an intuitive decomposition analysis to quantify the individual contribution of the two channels to the welfare cost of the risk. The exercise shows that 35 percent of the welfare cost is attributed to the negative wealth effects brought forth by realized housing disasters, whereas 65 percent is explained by the distortive portfolio allocation effects induced by the disaster risk in normal periods. This suggests that the second channel is a quantitatively crucial factor in determining the size of the welfare cost of the housing disaster risk. The fact that the first channel only plays a secondary role in the welfare evaluation is mainly due to the rarity of housing disasters. Although the exercise finds that households do suffer significant welfare losses in disaster periods through the channel, its importance in the welfare cost calculation is largely discounted by the low likelihood of having these disasters.

The second major finding is that the welfare evaluation of the housing disaster risk differs considerably in magnitude across age groups. The risk translates into a welfare loss of as much as 16 percent of annual non-housing consumption for the old, but a welfare gain of 2 percent for the young. This asymmetry is due to that older households typically hold more housing assets than the young. In disaster periods, declines in house prices favor the young, who purchase houses at depressed prices, but hurt the old, who rely on house sales to finance non-housing consumption. In normal periods, younger

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