

Kessel, Dany; Tyrefors Hinnerich, Björn; Vestman, Roine

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## The housing wealth effect: Quasi-experimental evidence

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# The Housing Wealth Effect: Quasi-Experimental Evidence

*Dany Kessel, Björn Tyrefors and Roine Vestman*

December 2018

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# The Housing Wealth Effect: Quasi-Experimental Evidence

Dany Kessel      Björn Tyrefors      Roine Vestman\*

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## Abstract

We exploit a quasi-experiment that occurred in Stockholm in 2007 to provide new evidence on the magnitude of the housing wealth effect. Stockholm's smaller city airport was expected to close in 2011 but its operating contract was unexpectedly renewed after political negotiation behind closed doors. We estimate an immediate shock of approximately  $-17\%$  to house prices close to the airport. Using a household data set with granular geographic information on primary residence, we find an elasticity among purchasers of new cars equal to 0.5. Converting our estimate to an aggregate MPC on cars, it is however less than 0.2 cents per dollar which in turn is likely to imply an MPC less than 3 cents per dollar on all goods and services. The effect is concentrated to homeowners with a loan-to-value ratio between 0.6 and 0.8, highlighting the role of credit and mortgage markets also in normal economic times.

**JEL classification:** D12, E21, E32, E44, E60.

**Keywords:** House prices, housing wealth, consumption, house price elasticity, marginal propensity to consume, collateral effect.

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# 1 Introduction

A fundamental topic in Economics that has received a lot of attention since the financial crisis is how the housing and housing finance markets interact with the macroeconomy. In particular, there is a rich literature on how housing booms and busts affect household consumption – commonly referred to as housing wealth effects.

The early theoretical literature argued that housing was a particular asset that would generate no or small effects.<sup>1</sup> Nevertheless, empirical studies found mixed results, depending on the use of aggregated data (e.g., Carroll et al. (2010, 2011), Case et al. (2013), Guerrieri and Iacoviello (2017)), or household level data (e.g., Campbell and Cocco (2007), Attanasio et al. (2009), Disney et al. (2010), Browning et al. (2013)), or on interpretation. Overall, contributors to the literature remained skeptical of their own estimates due to poor identification.<sup>2</sup> To date, the most credible estimates are based on instrumental variable regressions that rely on regional variation in the elasticity of housing supply (Mian et al. (2013); Aladangady (2017)) or city-wide variation in sensitivity to regional house prices (Guren et al. (2018)). Such estimates make strong assumptions on consumption demand factors being either uncorrelated with supply elasticities or observed to the econometrician. Concerns have been raised that these assumptions are not met (Davidoff (2016); Liebersohn (2017)).<sup>3</sup>

This paper adds to this literature in three ways. The first contribution is that our estimates of the housing wealth effect is based on a quasi-natural experiment. Our identification is novel in that it relies on an exogenous change of a negative externality that capitalizes locally into house prices. The source of variation is thus conceptually similar to for instance Chay and Greenstone (2005) and Currie et al. (2015). We use unanticipated news from

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<sup>1</sup>See footnote 2 of Berger et al. (2018) for a literature review.

<sup>2</sup>See Appendix E (Table 19) for a literature review.

<sup>3</sup>Mian and Sufi (2014) and Charles et al. (2017) establish strong interaction effects between the housing and labor markets. Liebersohn (2017) finds that elasticities are reduced by 40% once he controls for regional industry composition.

political bargaining in Stockholm regarding the continued operation of Bromma Airport to isolate a casual effect on households' housing wealth as a function of distance from the airport's noise contour. It is well-documented that the airport is a negative externality to its closest surrounding and it is capitalized into house prices within one quarter of the news announcement.<sup>4</sup> Using a data set on all transactions of single-family houses in Stockholm, we document a price decrease of 17% close to the airport's noise contour relative to further away. We then use a rich household-level data set that includes the geographic location of primary residence to document a decrease in purchase prices of new cars of 6% close to noise contour relative to households that purchase cars are reside further away. A two-sample IV approach establishes a sizeable elasticity of 0.5 among households that buy a new car. In contrast, we find little evidence for a response among purchasers of used cars or extensive margin effects. While aggregation is always tricky, and in principle state-dependent (see, e.g., Carroll and Dunn (1997) and Berger and Vavra (2015)), our estimates suggest that the housing wealth is about 4 to 6 times smaller than in the recent literature. Translated to an aggregate MPC out of housing wealth on cars, our elasticity amounts to 0.17 cents per dollar. Nevertheless our estimate is in line with a simple life-cycle permanent income model. Assuming that the MPC is identical on all goods and services our estimate implies a total MPC of 2.8 cents per dollar, or about half compared to recent evidence.

The second contribution of this paper is that we exploit our rich household-level data set to document cross-sectional heterogeneity in the elasticity. Informed by recent developments in incomplete market macroeconomics, we argue that the nature of house price variation is identical to the partial equilibrium wealth shock which is analyzed in Berger et al. (2018) and discussed in Kaplan et al. (2017). That is, it is akin to a destruction of housing wealth

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<sup>4</sup>Our means of identification is strikingly similar to the one proposed by Carroll et al. (2010), page 17: "[...] to isolate a 'pure' housing wealth effect, one would want data on spending by individual households before and after some truly exogenous change in their house values, caused for example by the unexpected discovery of neighborhood sources of pollution. The perfect experiment observed in the perfect microeconomic dataset is however not available."

stemming from a shift in preferences or beliefs rather than a destruction stemming from shifts in labor income or in credit market conditions. We confirm recent research (Mian et al. (2013); Aladangady (2017)) that balance sheet conditions, in particular a household's combined loan-to-value (CLTV) ratio, is critical for a household's response. We find that most homeowners finance new car purchases almost entirely by taking on additional debt and consistent with this, the entire elasticity is concentrated to homeowners with a CLTV ratio between 0.6 and 0.8. Furthermore, we confirm that elasticity between house prices and new car purchases vary substantially across groups of different age, income, housing wealth, and net worth. This cross-sectional variation in our estimates is consistent with the theoretical predictions proposed by Berger et al. (2018).

Finally, since our measure of household consumption is cars, our paper contributes to a large literature that estimates or tests the predictions of the (S, s) model. While households' auto purchases have been used previously to estimate housing wealth effects, our data is of such high quality that it de facto represents a novel test of the of the (S, s) model applied to the market for cars.<sup>5</sup> We find weak evidence in favor of the simplest model in that we cannot rule out a zero extensive margin effect on car purchases. That is, the likelihood of households' buying a car appears largely unaffected. Our estimates suggest that a negative effect of a magnitude greater than  $-0.15\%$  on the likelihood of purchasing a car can be ruled out with 97.5% probability. Our findings is thus in contrast to for instance Bar-Ilan and Blinder (1992) and instead suggestive in support of richer (S,s) models that allows for stochastics in the non-convex adjustment cost (Caballero and Engel (1993, 2007)). We re-iterate the call by Foote et al. (2000) and Caplin and Leahy (2010) for further microeconomic evidence. In any case, our findings have important implications for inference on consumption based on

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<sup>5</sup>Seminal contributions to the literature on (S, s) models and their applications to households' durable goods or car purchases are: Lam (1991), Eberly (1994), Bar-Ilan and Blinder (1992), Caballero (1993), Adda and Cooper (2000), Attanasio (2000), Hassler (2001), Bertola et al. (2005), and Schiraldi (2011). There is also important general equilibrium work – recent contributions include Gavazza et al. (2014).

observing only quantities of transacted cars at the regional level without further information about prices on those quantities.

The rest of the paper is structured as follows. Section 2 reviews the institutional setting and the quasi-experiment, Section 3 describes the data and Section 4 discusses the empirical strategy. Section 5 reports the results, and Section 6 concludes.

## 2 Institutional Setting and the Quasi-Experiment

This section provides an overview of Bromma Airport’s history and explains the quasi-experiment.

### 2.1 History and political governance

Bromma Airport is the airport of the city of Stockholm. The airport has one runway and is located close to the city in an area that is otherwise dominated by single-family housing. It is Sweden’s third airport. In the years between 2006 and 2015 it had about 60,000 takeoffs and landings per year. In the early years, Bromma was Sweden’s largest airport but after the establishment of the major international airport of Arlanda in 1959, Bromma airport saw a sharp decrease in traffic. By 1983 the traffic mainly consisted of private aviation. In 1992 the conservative-liberal national government opened up commercial airfare to competition and Bromma airport experienced an increase in traffic again. During the late 1990s and early 2000s, however, there was a general perception that Bromma airports would be closed – at latest 2011 when the operating contract would expire.<sup>6</sup>

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<sup>6</sup>There was a series of reports planning for the shutdown. In 1989 the municipality of Stockholm presented a major report proposing closing the airport by 1996 and using the centrally located area for housing (Stockholm, 1989). In 1994 the national government put together a commission tasked with the objective to figure out how fast Bromma airport could be phased out (Kommunikationsdepartementet, 1996). In 2000 Swedish Civil Aviation Administration presented a report on how they would phase out and eventually close Bromma airport by 2011 (Luftfartsverket, 2000).



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Sveriges Riksbank  
Visiting address: Brunkebergs torg 11  
Mail address: se-103 37 Stockholm

Website: [www.riksbank.se](http://www.riksbank.se)  
Telephone: +46 8 787 00 00, Fax: +46 8 21 05 31  
E-mail: [registratorn@riksbank.se](mailto:registratorn@riksbank.se)