Proposal for 2013 NBER Household Finance Research Grant*

The Interest Rate Elasticity of Mortgage Demand: Evidence from Bunching at the Conforming Loan Limit

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*This application is being submitted only on behalf of Anthony DeFusco, and he would be the sole recipient of any awarded funds. Andrew Paciorek is listed only for the sake of academic attribution.

**The views expressed here are those of the authors and do not necessarily reflect the views of the Federal Reserve Board of Governors or its staff.

I. Research Proposal

I.A Research Question

The purpose of this research is to provide novel and credible estimates of the interest rate elasticity of mortgage demand. Specifically, we estimate how the mortgage interest rate affects the amount a household borrows when purchasing a home. The magnitude of this elasticity has several important implications for policy-relevant questions in both household finance and macroeconomics. Given that mortgage debt constitutes such a large portion of overall household debt, this elasticity has a first-order effect on the degree to which monetary policy affects aggregate consumption and savings behavior (Hall, 1988; Mishkin, 1995; Browning & Lusardi, 1996). The magnitude of behavioral responses to mortgage interest rates is also important for U.S. fiscal policy because of the home mortgage interest tax deduction, which lowers the effective interest rate that homeowners pay (Poterba, 1984, 1992). Convincing estimates will also help inform the debate over how large a role rate policy played in the recent housing boom. Finally, the elasticity has implications for government intervention in the secondary mortgage market, since the purchase activity of the government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, lowers mortgage interest rates on conforming loans (Passmore et al., 2002; Adelino et al., 2012; Kaufman, 2012).

I.B Research Design and Needs

Data limitations have forced prior research on this question to rely on what is now recognized as being endogenous variation in interest rates (Moriizumi, 2000; Gary-Bobo & Larribeau, 2004; Leece, 2006).[1] The literature estimating interest rate elasticities of other smaller components of consumer credit demand such as credit card, auto, and micro-finance debt, has been more fruitful, thanks to the availability of detailed microdata and variation in interest rates arising from either quasi-experimental policy changes or field experiments (Gross & Souleles, 2002; Alessie et al., 2005; Karlan & Zinman, 2008; Attansio et al., 2008). In the spirit of these studies, our approach combines mortgage microdata with recent insights from the public finance literature on bunching at policy-induced non-linearities in household budget constraints in order to estimate the interest rate elasticity of mortgage demand. To the best of our knowledge, ours is the first application of these methods to the mortgage market (or to a consumer credit market of any kind).

We exploit a regulatory requirement imposed on the GSEs that generates quasi-experimental variation in the relationship between loan size and interest rates. The GSEs are only allowed to purchase loans for dollar amounts that fall below the conforming limit, a nominal cap set by their regulator each year. Interest rates on loans above this limit (jumbo loans) are typically higher than rates on comparable loans below the limit due to the fact that they are not backed by the same implicit government guarantee.[2]

The difference in interest rates between jumbo and conforming loans creates a substantial notch in the budget constraint of households deciding how much mortgage debt to incur. This induces some borrowers who would otherwise take out loans above the conforming limit to instead bunch right at the limit. A series of papers in public economics have developed econometric methods for estimating elasticities in such settings (Saez, 2010; Chetty et al., 2011, 2012; Best & Kleven, 2012; Kleven & Waseem, 2012; Kopczuk & Munroe, 2012). We adapt these methods to the case of mortgage choice in the face of a non-linear interest rate schedule. Intuitively, the excess mass of households who take out loans at exactly the conforming limit provides a measure of the behavioral response to the interest rate differential. The ratio of the magnitude of this behavioral response to the rate differential is the interest rate elasticity of mortgage demand.

The amount of bunching can be readily estimated given microdata on observed loan sizes. However,

[1] Martins & Villanueva (2006) and Jappelli & Pistaferri (2007) are two exceptions. These papers use, respectively, quasi-experimental variation in the tax treatment of mortgage interest in Italy and in explicit mortgage interest rate subsidies in Portugal. However, they either focus almost entirely on the extensive margin or find no evidence of an effect. It is possible that the variation they use, which arises through the tax code, is less salient than variation in the nominal rate charged by the lender, in which case one might expect a small effect.

[2] This implicit guarantee became explicit in 2008 when the GSEs were placed into government conservatorship.

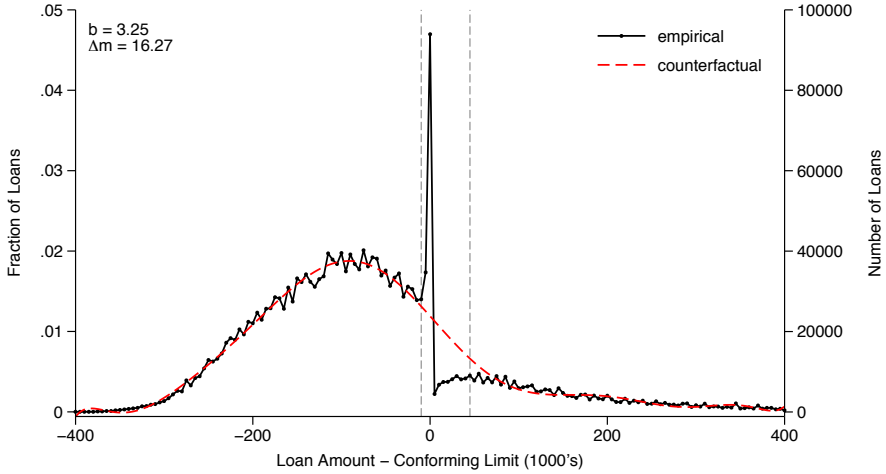
accurately measuring the rate differential using data on observed interest rates is complicated by the presence of sorting around the conforming limit. This issue is particularly relevant in our context as made evident by the very fact that households bunch at that point. Some of the bias arising from this sorting can be mitigated using semiparametric estimators (Sherlund 2008) or instrumental variables (Kaufman 2012). However, a more direct way of measuring the true interest rate difference facing a given household would be to obtain data on the rate sheets banks use to price their mortgages. For recent years, such rate sheet data exist and are available for purchase from LoanSifter, a private firm that aggregates data on lender rate sheets to provide to mortgage brokers. The funds awarded by the NBER Household Finance grant would be used to acquire this data.[3]

I.C Data and Preliminary Results

Thus far, our data come from two sources. The first is a proprietary dataset of housing transactions from DataQuick which provides us with information on nearly all residential real estate sales in 99 Metropolitan Statistical Areas going back as far as 1987. Because the data include the loan amounts on up to three mortgages used to finance the purchase, we can construct the full loan size distribution at any level of geographic or temporal aggregation. We then use this distribution to measure the amount of excess mass and bunching at the conforming limit.

In preliminary results, shown graphically below in Figure 1, we find that on average 3.25 times more households take out mortgages precisely at the conforming limit than would be expected in the absence of the limit.[4] This implies a reduction in mortgage size of roughly $16,270, which is about 5 percent of the average conforming limit during our sample period. Additional results indicate that this response appears to come largely from a reduction in loan size with relatively little accompanying change in housing consumption. This implies that households must be reducing current consumption or saving less via financial assets.

Figure 1: Bunching at the Conforming Limit



The second dataset comes from Lender Processing Services (LPS), a data vendor providing nationally representative loan-level data on interest rates, contract terms, and borrower characteristics such as FICO scores and debt to income ratios. We plan to use these data to estimate the jumbo-conforming interest rate spread. However, as mentioned, rate sheet data from LoanSifter would allow us to convincingly validate the estimates derived from the LPS data because it provides a measure of the exact difference in interest rates facing a given household deciding whether to take out a jumbo or conforming loan.

[3] To the extent that it is possible, we would be glad to make this data available to other researchers and would make every attempt to negotiate the terms of the purchase accordingly.

[4] The figure shows the empirical loan size distribution in solid black and our estimated counterfactual in dashed red. The counterfactual is obtained, as in Chetty et. al (2011), from the predicted values of a polynomial fit to the observed distribution, dummying out the loan amounts in the excluded region marked by the vertically dashed grey lines.

I. D References

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II. Proposed Budget

Budget Item	Estimated Amount
Mortgage interest rate sheet data to be purchased from LoanSifter*	$ 20,000.00
Total	$ 20,000.00

* The grant applicant (Anthony DeFusco) has received an informal quote of $20,000 from LoanSifter. This data will be made available to other researchers upon completion of the project provided that it is possible to negotiate such a contract with LoanSifter. Other research expenses such as travel will be paid by the grant applicant's home department.

Anthony A. DeFusco

Curriculum Vitæ
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Education

University of Pennsylvania - Wharton School, Philadelphia, Pennsylvania
Ph.D., Applied Economics — *(expected)* May 2014
M.A., Applied Economics — May 2012

Temple University, Philadelphia, Pennsylvania
B.A. Mathematical Economics, Mathematics (*Magna cum Laude*) — May 2009

Research & Teaching Fields

Primary: Urban Economics and Real Estate, Household Finance
Secondary: Public Economics, Applied Microeconomics

Work Experience

University of Pennsylvania - Wharton School
Research Assistant, Joseph Gyourko — 2010-2011
Research Assistant, Fernando Ferreira — 2010-2011
Research Assistant, Katja Seim — 2011

Federal Reserve Bank of Philadelphia, Philadelphia, Pennsylvania
Research Assistant, Retail Risk Analysis Group — 2008-2009

Econsult Corporation, Philadelphia, Pennsylvania
Research Analyst Intern — 2007, 2009

Teaching Experience

University of Pennsylvania - Wharton School
Head Teaching Assistant, Managerial Economics (Undergraduate) — 2013
Teaching Assistant, Managerial Economics (Undergraduate) — 2012
Teaching Assistant, Urban Fiscal Policy (MBA and Undergraduate) — 2010-2011

Temple University
Teaching Assistant, Honors Calculus I and II (Undergraduate) — 2006-2008
Teaching Assistant, Principles of Microeconomics (Undergraduate) — 2006-2008

Research in Progress

Does Student Debt Affect Household Formation and Homeownership Rates? Evidence from Pell Grants

The Interest Rate Elasticity of Mortgage Demand: Evidence from Bunching at the Conforming Loan Limit
(joint with Andrew Paciorek)

The Role of Contagion in the Last American Housing Cycle
(joint with Wenjie Ding, Fernando Ferreira, and Joseph Gyourko)

Online Crowdfuding and Threshold Effects in Sequential Fundraising Campaigns
(joint with Yiwei Zhang)

Invited Presentations

NBER Summer Institute - Housing and the Financial Crises (July 2012)

Grants & Awards

University of Chicago Price Theory Summer Camp	2012
Russell Ackoff Doctoral Student Fellowship Award	2012
Wharton Doctoral Travel Grant	2011
Wharton Doctoral Educational Fellowship	2009-Present
Francis J. Sholomskas Memorial Award for excellence in Mathematics	2009
Norman and Ruth Sun Award for most outstanding economics major	2009
Phi Beta Kappa	2008

Computer Skills & Languages

Statistical Software: STATA, Matlab, R, EViews, SAS
Operating Systems: Unix/Linux, OSX, Windows
Other: ArcGIS, LaTeX, SQL, Microsoft Office

Professional Affiliations

American Economics Association
Urban Economics Association
Penn Institute for Urban Research

References

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