2008 FINANCIAL CRISIS: A TEN-YEAR REVIEW November 8-9, 2018





ANNUAL MIT GOLUB CENTER REVIEWS GCFP FOR FINANCE AND POLICY Y NYU STERN



Jenni Rankin



JOURNALS A-Z JOUR

Journals A-Z Analytical Chemistry Animal Biosciences Anthropology Astronomy and Astrophysics Biochemistry Biomedical Data Science (new in 2018) **Biomedical Engineering** Biophysics **Cancer Biology** Cell and Developmental Biology **Chemical and Biomolecular Engineering Clinical Psychology** Genetics

Computer Science Condensed Matter Physics Control, Robotics, and Autonomous Systems (new in 2018) Criminology (new in 2018) Earth and Planetary Sciences Ecology, Evolution, and Systematics **Economics** Entomology **Environment and Resources Financial Economics** Fluid Mechanics Food Science and Technology

Genomics and Human Genetics Immunology Law and Social Science Linguistics Marine Science Materials Research Medicine Microbiology Neuroscience Nuclear and Particle Science Nutrition Organizational Psychology and Organizational Behavior

Pathology: Mechanisms of Disease

Pharmacology and Toxicology Physical Chemistry Physiology Phytopathology Plant Biology Political Science Psychology **Public Health Resource Economics** Sociology Statistics and Its Application Virology Vision Science

Editorial Board Members

- Tobias Adrian, IMF
- Yacine Aït-Sahalia, Princeton
- Patrick Bolton, Columbia
- Robert Jarrow, Cornell
- Li Jin, Peking University
- Kose John, NYU
- Debra Lucas, MIT
- Matthew Richardson, NYU,
- Anoinette Schoar, MIT

Annual Reviews Staff

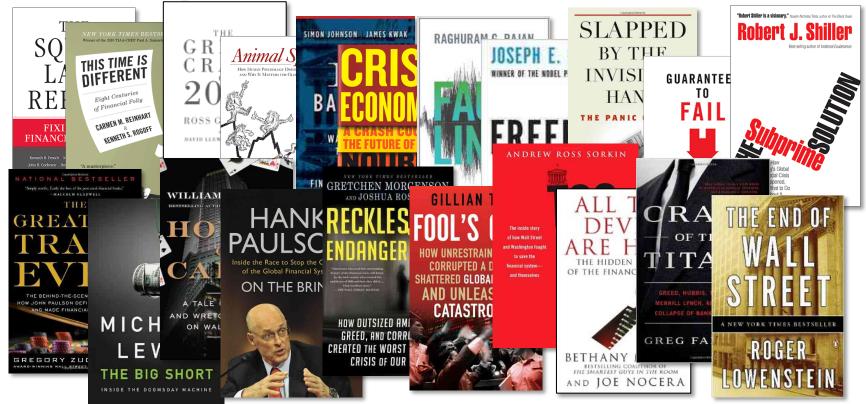
- Sam Gubins, former president and editor-in-chief
- **Richard Gallagher**, current president and editor-in-chief
- Liz Allen, Director MarCom & Strategic Development
- Paul Calvi, Director of Technology
- Eva Emerson, Senior Editor, Magazine
- Jennifer Jongsma, Associate Editor-in-Chief & Director of Production
- Cathy Kirkman, Corporate Secretary and Executive Assistant
- Andrea Lopez, Director of Sales
- Jonathan Michael, Chief Financial Officer
- Kamran Naim, Director of Partnerships and Initiatives
- Lisa Wucher, Director of Human Resources

Volume 1, 2009

Preface to the Annual Review of Financial Economics Andrew W. Lo and Robert C. Merton
An Enjoyable Life Puzzling Over Modern Finance Theory <i>Paul A. Samuelson</i>
Credit Risk Models Robert A. Jarrow
The Term Structure of Interest Rates <i>Robert A. Jarrow</i>
Financial Crises: Theory and Evidence Franklin Allen, Ana Babus, and Elena Carletti
Modeling Financial Crises and Sovereign Risks Dale F. Gray
Never Waste a Good Crisis: An Historical Perspective on Comparative Corporate Governance <i>Randall Morck and Bernard Yeung</i>
Capital Market-Driven Corporate Finance Malcolm Baker
Financial Contracting: A Survey of Empirical Research and Future Directions Michael R. Roberts and Amir Sufi
Consumer Finance <i>Peter Tufano</i>
Life-Cycle Finance and the Design of Pension Plans Zvi Bodie, Jérôme Detemple, and Marcel Rindisbacher
Finance and Inequality: Theory and Evidence Asli Demirgüç-Kunt and Ross Levine

Volatility Derivatives Peter Carr and Roger Lee	
Estimating and Testing Continuous-Time Models in Finance: The Role of Transition Densities <i>Yacine Aït-Sahalia</i>	
Learning in Financial Markets Lubos Pastor and Pietro Veronesi	
What Decision Neuroscience Teaches Us About Financial Decision Making Peter Bossaerts 383	

The Many Narratives of the Crisis



The Many Narratives of the Crisis

Journal of Economic Literature 2012, 50:1, 151–178 http://www.aeaweb.org/articles.php?doi=10.1257/jel.50.1.151

Reading About the Financial Crisis: A Twenty-One-Book Review

ANDREW W. LO*

The recent financial crisis has generated many distinct perspectives from various quarters. In this article, I review a diverse set of twenty-one books on the crisis, eleven written by academics, and ten written by journalists and one former Treasury Secretary. No single narrative emerges from this broad and often contradictory collection of interpretations, but the sheer variety of conclusions is informative, and underscores the desperate need for the economics profession to establish a single set of facts from which more accurate inferences and narratives can be constructed. (JEL E32, E44, E52, G01, G21, G28)

The Many Narratives of the Crisis

- Crisis is all about subprime portrage lending
- Policy and lower lending star to ds were at fault
- Bankers didn't have er is skin in the game"
- No one saw the cross co hing
- Devotion to many terficiency caused the crisis
- Changes in regulation allowed huge increases in leverage

8 Nov 2018

© 2018 by Andrew W. Lo All Rights Reserved



Home / Annual Review of Financial Economics / Volume 10, 2018 / Adelino, pp 25-41

The Role of Housing and Mortgage Markets in the Financial Crisis

Annual Review of Financial Economics

Vol. 10:25-41 (Volume publication date November 2018) https://doi.org/10.1146/annurev-financial-110217-023036

Manuel Adelino,^{1,2} Antoinette Schoar,^{2,3} and Felipe Severino⁴

¹Fuqua School of Business, Duke University, Durham, North Carolina 27708, USA
 ²National Bureau of Economic Research, Cambridge, Massachusetts 02138, USA
 ³Sloan School of Management, Massachusetts Institute of Technology, Cambridge, Massachusetts 02142, USA; email: aschoar@mit.edu
 ⁴Tuck School of Business, Dartmouth College, Hanover, New Hampshire 03755, USA



WIDESPREAD INCREASES IN MORTGAGE LEVERAGE

The significant increase in mortgage and other household debt in the period leading up to the 2008 crisis has been widely documented. Brown et al. (2010) show that household mortgage debt almost doubled between 2000 and 2007, and contrary to earlier periods, increases in mortgage debt were not offset by reductions in other household debt. Remarkably, in the run-up to the crisis, this increase in leverage was prevalent across all income groups and was closely tied to house-price appreciation across neighborhoods. Adelino, Schoar & Severino (2016) document that the increase in household leverage, measured as DTI levels, went up across all income groups and all credit scores. Figure 1 shows the increase in mortgage credit during the period 2001–2007 and demonstrates that the flow of new (purchase) mortgages across incomes was stable over this period. Adelino, Schoar & Severino (2016) also document similar patterns across the credit score distribution. In other words, the fraction of credit going middle- and high-income households did not change over the period 2001–2007. But since richer household higher credit scores take out larger mortgages, the dollar value of mortgage credit held by middle-class ar middle-class borrowers increased significantly over this time period. Adelino, Schoar & Severino (2017) also show the increase in DTI ratios was almost twice as high in states with high house-price appreciation compared to thos.

<u>F</u> ile <u>E</u> dit <u>V</u> iew Hi <u>s</u> tory <u>B</u> ookmarks <u>T</u> o	vols <u>H</u> elp	-	٥	×
The Role of Housing and Mortg X	\bigcirc annual review of financial econ $ imes imes imes$ +			
(←) → C	🔅 🖲 🔒 https://www.annualreviews.org/doi/full/10.1146/annurev-financial-110217-	<u>↓</u> III\	٦ ا) =
🗢 🌣 Most Visited 🥑 Getting Started	i 🗁 From Google Chrome 🖨 XC 🔰 15.480 🗎 Journ 🕜 Speed 🖨 VZ 🖨 XFin 🖨 MITReg 📙 MITAddDrop 🖨 MOIRA 🖨 MITLib 🖨 CamM (🕀 CamB	🖨 CamF	»

HOW DID LENDING STANDARDS CHANGE IN THE BOOM?

In the previous section, we showed that DTI levels increased proportionally for all income groups. DTI levels are usually seen as an indicator of a household's ability to pay its mortgage. But since mortgage loans are collateralized by the value of the house, the key indicator of changing lending standards is CLTV ratios at origination. This is the amount of mortgage leverage including any second liens or home equity loans on the house. It is often argued that the way the financial sector can create a bubble in housing markets is by relaxing CLTV requirements (see, for example, Geanakoplos 2010).

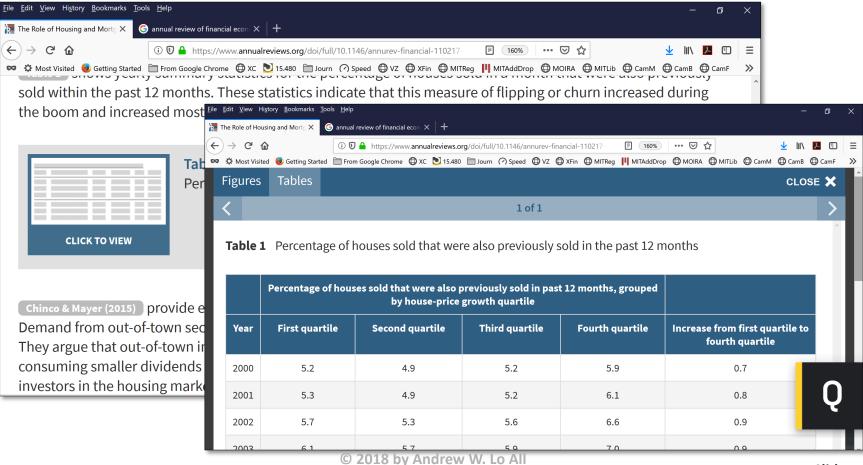
Figure 2 shows that the distribution of CLTV ratios at origination for purchase mortgages remained stable between 2001 and 2007. The median home purchased between 2001 and 2007 had a CLTV of 90%, and me in the 90th percentile of the leverage distribution had a CLTV just lower than 100%. Furthermore,
 Adelino, Schoar & Severino (2017) show that there is no difference in the stability of the CLTV distribution between areas with high and low house-price growth. Ferreira & Gyourko (2016) also show that CLTV ratios between 1
 2011 were stable and did not increase dramatically during the boom period. Somewhat contrary to popular belie.,



NO EXPANSION OF HOMEOWNERSHIP

Several researchers have explicitly asked if an erosion of credit standards happened at the extensive margin. In other words, did distortions in credit origination allow households with low income and poor credit quality, who previously were rationed out of the market, to become homeowners (see Mian & Sufi 2015)? Goodman & Mayer (2018) present evidence that runs counter to this hypothesis. Using data from the American Housing Survey, they show that the overall US homeownership rate rose from 63.5% in 1985 to 68.8% in 2005. However, most of the increase was concentrated in the period before 2000, that is, before the onset of the mortgage expansion. It then dropped to 62.7% after the onset of the financial crisis.

But aggregate homeownership rates might mask important changes in the composition of borrowers if the significant expansion of credit to marginal households. Adelino, Schoar & Severino (2017) test this idea by company changes in homeownership rates for high-versus low-income households across regions. Figure 3 shows housing boom made homeownership less accessible for the lowest-income households. In particular, star 2001, low-income households entered homeownership at lower rates than middle- and high-income households,



<u>F</u> ile <u>E</u> dit <u>V</u> iew Hi <u>s</u> tory <u>B</u> ookmarks <u>T</u> ool	is <u>H</u> elp	-	٥	×
The Role of Housing and Mortg 🗙 🤅) annual review of financial econ $ imes imes imes$ +			
(←) → (⊂) ↔	🛈 👽 🚔 https://www.annualreviews.org/doi/full/10.1146/annurev-financial-110217- 🛛 🗏 🛛 160% 🛛 🚥 😒 🏠	<u>↓</u> III\	٦	=
🗢 🌣 Most Visited 🥑 Getting Started	🖶 From Google Chrome 🔀 XC Ď 15.480 🗎 Journ 🔿 Speed 🕀 VZ 🕀 XFin 🔀 MITReg 👖 MITAddDrop 🕀 MOIRA 🕀 MITLib 🕀 CamM (🕀 CamB	🖨 CamF	»

DEFAULTS IN THE MIDDLE CLASS

Early in the crisis, most commentators focused on the high levels of subprime foreclosures experienced during the bust (using different definitions of subprime, as pointed out by Mayer & Pence 2009). This is not surprising, given that in some areas subprime foreclosure rates were as high as 20% during the crisis. Further, the cost to families and neighborhoods was very high (Campbell, Giglio & Pathak 2011). However, subprime default levels are high even in good economic times, with an average of almost 6%, and subprime mortgages are small compared to prime mortgages (Amromin & Paulson 2009).

Adelino, Schoar & Severino (2016) show that ex post defaults increased most sharply for middle-income and prime borrowers. Since these borrowers take on larger mortgages, the fraction of mortgage dollars in delinquen increased most steeply for this group. Mayer, Pence & Sherlund (2009) point out that, already at the beginning foreclosure crisis, the proportional increase in default rates for Alt-A, or near-prime, loans was larger than subprime loans. Ferreira & Gyourko (2016) similarly estimate that, although defaults during the housing bust occurred on prime and subprime mortgages, almost twice as many prime as subprime borrowers lost their homes

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the obj

ACKNOWLEDGMENTS

We thank Matt Richardson, the review

LITERATURE CITED

Acharya V. Richardson M. Van Nieuwerbu and the Debacle of Mortgage Finance, Pr Acolin A, Bostic W, An X, Wachter SM. 20 mortgages. Hous. Policy Debate 27:393-Acolin A, Calem PS, Jagtiani J, Wachter Pap. 17-36, Res. Dep., Fed. Reserve Bi Adelino M, Schoar A, Severino F. 2015. L NBER Work, Pap. 21320 Adelino M, Schoar A, Severino F. 2016. L middle class, Rev. Financ, Stud, 29(7): Adelino M, Schoar A, Severino F. 2017. D Pap. 23502 Agarwal S, Amromin G, Ben-David I, Ch subprime crisis. J. Financ. Econ. 113(1): Albanesi S, De Giorgi G, Nosal J. 2017. C Pap. 23740 Allen F, Gorton G. 1993. Churning bubble Ambrose BW, Conklin J, Yoshida J. 2015. in the mortgage market. Work. Pap., Sm Amromin G, Paulson AL, 2009, Comparin Reserve Bank Chic. Econ. Perspect. 33:18-Bailey M. Dávila E. Kuchler T. Ströbel I. Pap. 24091 Barberis N. Greenwood R. Jin L. Shleifer 7. Financ. Econ. 115(1):1-24 Barlevy G, Fisher J. 2010. Mortgage choice Chic., Chicago Ben-David I. 2011. Financial constraints at Appl. Econ. 3(3):55-87 Bernanke BS, 2007, Global imbalances: rec Syst., Washington, DC Bernanke BS, Gertler M, Gilchrist S. 1999." In Handbook of Macroeconomics, Vol. 10 Bhutta N. 2015. The ins and outs of mo 76:284-98 Bhutta N, Dokko J, Shan H. 2010. The depth Finance Econ. Discuss. Ser., Board Ge Bhutta N, Keys BJ. 2016. Interest rates a 106(7):1742-74 Bostic R, Gabriel S, Painter G. 2009. Housi micro data. Reg. Sci. Urban Econ. 39:79

28 Adding . Schoor . Severing

- Brown M, Haughwout A, Lee D, Van der Klaauw W. 2010. The financial crisis at the ki bousebold debt and credit, Staff Rep. 480, Fed. Reserve Bank N.Y., New York Brown M. Stein S. Zafar B. 2015. The impact of housing market on consumer debt: ci from 1999 to 2012. 7. Money Credit Bank. 47(S1):175-213
- Burnside C, Eichenbaum M, Rebelo S. 2016. Understanding booms and busts in housi Econ. 124:1088-147
- Campbell JY, Cocco JF, 2007, How do house prices affect consumption? Evidence from Econ. 54:591-621
- Campbell JY, Giglio S, Pathak P. 2011. Forced sales and house prices. Am. Econ. Rev. 10 Case KE, Shiller RJ, 2003. Is there a bubble in the housing market? Brookings Pap. Econ.
- Charles KK, Hurst E, Notowidigdo M, 2015, Housing booms and busts, labor market opp attendance, NBER Work, Pap. 21587
- Charles KK, Hurst E, Notowidigdo M. 2016. The masking of the decline in manufactur the housing bubble, 7. Econ. Perspect, 30(2):179-200
- Chemla G, Hennessey C. 2014. Skin in the game and moral hazard. 7. Finance 69(4):159 Cheng I-H, Raina S, Xiong W. 2014. Wall Street and the housing bubble. Am. Econ. Rev. Chinco A, Mayer C. 2015. Misinformed speculators and mispricing in the housing market
- 29(2):486-522 Coleman M IV, LaCour-Little M, Vandell KD. 2008. Subprime lending and the housi
- dog? J. Hous. Econ. 17:272-90 Cutler DM, Poterba JM, Summers LH. 1991. Speculative dynamics. Rev. Econ. Stud. 58(Dang TV, Gorton G, Holmström B. 2010. Opacity and the optimality of debt in liquidity pro-
- MIT, Cambridge, MA DeFusco AA, Nathanson CG, Zwick E. 2017. Speculative dynamics of prices and volume. NBER
- Dell'Ariccia G. Igan D. Laeven L. 2012. Credit booms and lending standards: evidence mortgage market, 7. Money Credit Bank, 44:367-84
- Demyanyk Y, Van Hemert O. 2011. Understanding the subprime mortgage crisis. Rev. Fi
- Di Maggio M, Kermani A. 2017. Credit-induced boom and bust. Rev. Financ. Stud. 30(11 Elul R, Tilson SG. 2015. Owner occupancy fraud and mortgage performance. Work. Pap. Bank Phila., Philadelphia
- Ferreira F, Gyourko J. 2016. A new look at the U.S. foreclosure crisis: panel data evidence borrowers from 1997 to 2012, NBER Work, Pap. 21261
- Ferreira F, Gyourko J. 2018, Anatomy of the beginning of the bousing boom: U.S. neighbor areas, 1993-2009. Work. Pap., Wharton Sch., Univ. Pa., Philadelphia
- Foote CL, Gerardi KS, Willen PS. 2008. Negative equity and forcelosure: theory and evi 64:234-45
- Foote CL, Gerardi KS, Willen PS. 2012. Why did so many people make so many ex post ha of the foredosure crisis. NBER Work. Pap. 18082
- Foote CL, Loewenstein L, Willen PS. 2016. Cross-sectional patterns of mortgage debt duri evidence and implications, NBER Work, Pap. 22985
- Fuster A, Willen PS. 2017. Payment size, negative equity, and mortgage default. Am. $9(4) \cdot 167 - 91$
- Garmaise MJ. 2015. Borrower misreporting and loan performance. J. Finance 70(1):449-Geanakoplos J. 2010. The leverage cycle. In NBER Macroeconomic Annual 2009, Vol. 1 K Rogoff, M Woodford, pp. 1-65. Chicago: Univ. Chic. Press
- Gerardi AL, Sherlund SM, Willen P. 2008. Making sense of the subprime crisis. Broc 2008:69-159
- Gerardi K, Herkenhoff KF, Ohanian LE, Willen PS. 2017. Can't pay or won't pay? Une equity, and strategic default. Rev. Financ. Stud. 31(3):1098-131
- Gertler M, Gilchrist S. 1994. Monetary policy, business cycles, and the behavior of small 1 Q. 7. Econ. 109(2):309-40
 - www.annualreviews.org Housing and Morigage in the Financial Crisis 20

- Glaeser EL, Nathanson CG, 2015. An extrapolativ Goodman LS, Mayer C. 2018. Homeownership a Greenwald DL. 2016. The mortgage credit channel Manag., MIT, Cambridge, MA Griffin JM, Maturana G. 2016. Who facilitated mi Guerrieri V, Hartley D, Hurst E. 2013. Endogeno 100-45-60 Gupta A. 2017. Foreclosure contagion and the neig In press Gyourko J, Linneman P. 1997. The changing inf homeownership by age over time. J. Hous. Re Hanson SG, Kashyap AK, Stein JC. 2011. A macro 25(1):3-28 Haughwout A, Lee D, Tracy JS, Van der Klaauw market crisis. Staff Rep. 514, Fed. Reserve Ban Himmelberg C, Mayer C, Sinai T. 2005. Assessing tions, 7. Econ. Perspect, 19:67-92
- Hsu JW, Matsa DA, Melzer BT. 2018. Unemple Rev. 108(1):49-81 Hurst E, Stafford F. 2004. Home is where the equ J. Money Credit Bank. 36:985-1014
- Jiang W, Nelson AA, Vytlacil E. 2014. Liar's loan? on mortgage delinquency. Rev. Econ. Stat. 96: 5 Justiniano A, Primiceri GE, Tambalotti A. 2015. Co Bank Chic., Chicago

419

- Kaplan G, Mitman K, Violante G. 2017. Consump NBER Work. Pap. 23694
- Keys BJ, Mukherjee T, Seru A, Vig V. 2010. Did se loans. Q. 7. Econ. 125(1):307-62 Kiyotaki N, Moore J. 1997. Credit cycles. J. Polit
 - Kuminoff NV, Pope JC. 2013. The value of reside 2 and bust, Land Econ, 89(1):1-29 Landvoigt T, Piazzesi M, Schneider M. 2015. The Lehnert A. 2004. Housing, consumption, and credit or
 - Board Gov, Federal Reserve Syst., Washingto Lewis M. 2010. The Big Short: Inside the Doomsday Lo AW. 2005. Reconciling efficient markets with be
- Consult. 7:21-44 Mayer C, Morrison E, Piskorski T, Gupta A. 201 from a legal settlement with Countrywide. A
- Mayer C, Pence K. 2009. Subprime mortgages: wh Risk, Regulation, and Policy, ed. EL Glaeser, Land Policy Mayer C, Pence K, Sherlund SM. 2009. The rise
- Mian A, Sufi A. 2009. The consequences of mortga crisis. Q. J. Econ. 124(4):1449-96 Mian A, Sufi A. 2011. House prices, home equity-Econ. Rev. 101(5):2132-56

40 Adelino • Schoar • Severino

www.annualreviews.org • Housing and Morigage in the Financial Crisis 41

© 2018 by Andrew W. Lo All **Rights Reserved**

Slide 16

- Financial Crisis, ed. EL Glaeser, T Sinai, pp.

Glaeser EL, Gottlieb J, Gyourko J. 2013. Can cheap credit explain the housing boom? In Housing and the

- Mian A, Sufi A. 2014. What explains the 2007-2009 drop in employment? Econometrica 82(6):2197-223 Mian A, Sufi A. 2015. House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent
- It from Happening Again. Chicago: Univ. Chic. Press Nathanson CG, Zwick F., 2018, Arrested development: theory and evidence of supply-side speculation in the housing
- market. NBER Work. Pap. 23030
- Palmer C. 2015. Why did so many subprime borrowers default during the crisis: loose credit or plummeting prices? Work. Pap., Sloan Sch. Manag., MIT, Cambridge, MA
- Parlour C, Plantin G. 2008. Loan sales and relationship banking. J. Finance 63(3):1291-314
- Piazzesi M, Schneider M. 2009. Momentum traders in the housing market: survey evidence and a search model. Am. Econ. Rev. 99(2):406-11
- Piazzesi M, Schneider M. 2016. Housing and macroeconomics. In Handbook of Macroeconomics, Vol. 2B, ed. IB Taylor, H Uhlig, pp. 1547-640, Amsterdam: Elsevier
- Piskorski T, Seru A, Witkin J. 2015. Asset quality misrepresentation by financial intermediaries: evidence from the RMBS market, 7. Finance 70(6):2635-78
- Raian R. 2010, Fault Lines: How Hidden Fractures Still Threaten the World Economy, Princeton, NI: Princeton Univ. Press
- Rampini A. Viswanathan S. 2010. Collateral, risk management, and the distribution of debt capacity. T. Finance 65:2293-322
- Shiller RJ. 2007. Understanding recent trends in house prices and home ownership. NBER Work. Pap. 13553
- Shiller RJ. 2014. Speculative asset prices. Am. Econ. Rev. 104:1486-517
- Stein JC. 1995. Prices and trading volume in the housing market: a model with down-payment effects. Q. 7. Econ. 110(2):379-406
- Turner TM, Smith MT. 2009. Exits from homeownership: the effects of race, ethnicity, and income. J. Reg. Sci. 49(1):1-32

Volume 10, 2018

2008 Financial Crisis: A Ten-Year Review

Liquidity, Leverage, and Regulation 10 Years After the Global Financial Crisis Tobias Adrian, Jobn Kiff, and Hyun Song Sbin
The Role of Housing and Mortgage Markets in the Financial Crisis Manuel Adelino, Antoinette Schoar, and Felipe Severino
Financial Crises Gary Gorton
Mortgage-Default Research and the Recent Foreclosure Crisis Christopher L. Foote and Paul S. Willen
Recent Research on Banks' Financial Reporting and Financial Stability Stephen G. Ryan
Systemic Risk 10 Years Later Robert Engle
Regulatory Reform Andrew Metrick and June Rbee
Intermediary Asset Pricing and the Financial Crisis Zbiguo He and Arvind Krisbnamurtby
Deregulating Wall Street Matthew Richardson, Kermit L. Schoenholtz, and Lawrence J. White
Deglobalization: The Rise of Disembedded Unilateralism <i>Harold James</i>

Other Articles of Current Interest

Measuring Investor Sentiment Guofu Zbou	239
Risks in China's Financial System Zbeng (Micbael) Song and Wei Xiong	261

Shadow Banking in China Kinda Hacbem
Liquidity, Risk Premia, and the Financial Transmission of Monetary Policy Itamar Drechsler, Alexi Savov, and Philipp Schnabl
Risk-Neutral Densities: A Review Stephen Figlewski
Capital Reallocation Andrea L. Eisfeldt and Yu Shi
Capital Structure and a Firm's Workforce David A. Matsa
Common-Ownership Concentration and Corporate Conduct Martin C. Schmalz
Forecasting Methods in Finance Allan Timmermann
Variance Risk Premia, Asset Predictability Puzzles, and Macroeconomic Uncertainty <i>Hao Zbou</i>
Recurring Firm Events and Predictable Returns: The Within-Firm Time Series Samuel M. Hartzmark and David H. Solomon



© 2018 by Andrew W. Lo All Rights Reserved

z,

Thank You!