Albuquerque, New Mexico, August 2004

Measurement and Mobilization: Mapping the Institutional and Legal Spaces of Subprime Mortgage Capital

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April, 2007

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Abstract: Recent turbulence in U.S. financial markets has been explained partly in terms of mortgage lending, with front-page news coverage of the esoteric securitization and underwriting details of the high-risk, high-profit "subprime" market that primarily deals with borrowers constrained by blemished credit. Yet the dynamics of subprime lending, and its role in predatory financial exploitation of racially and ethnically marginalized peoples, have been understood for many years among researchers, attorneys, and organizers in a movement that has been growing since the 1970s -- the Community Reinvestment Movement. Unfortunately, most of this knowledge comes either from rich local case studies of particular communities (offering few comparative insights) or from detailed economic and regulatory studies at the national level (ignoring regional and local variations). Little is known about the meso-scale: the systematic penetration of subprime mortgage capital into the multiplicity of different cities and neighborhoods across the United States.

In this paper, we map the American urban system in terms of the proliferation of subprime mortgage lending. We use Brian J.L. Berry's (1972) *City Classification Handbook* to inspire contemporary questions of analysis and activism: how can we classify the different social and institutional settings in which subprime and predatory lending take place? How can we classify the new system of regulation created by long-term organizing to demand action from state legislatures? We analyze the new loan-pricing data in the Home Mortgage Disclosure Act files to produce geographical "thick descriptions" of lending regimes that remain local and contextual even in the face of integration into transnational capital markets. We find that places marginalized by older types of denial-based credit exclusion are also woven into newer processes of stratified, exploitative credit inclusion -- whether measured at the metropolitan or neighborhood scale. We also find evidence, via multivariate analysis of loan-level credit decisions, that the evolving landscape of state legislation has significantly altered the geographical contours of discriminatory segmentation into high-cost subprime lending.

K Street, Wall Street, Main Street

Three weeks after the U.S. Presidential election of 2004, a prominent group of bankers, lobbyists, and public-relations consultants gathered in Washington, DC. The meeting agenda centered on a series of esoteric changes to the rules implementing the Home Mortgage Disclosure Act (HMDA) of 1975. After several years of regulatory delay in the face of competing demands from the lending industry and community organizations, the Federal Reserve Board had finally mandated the addition of a few data fields in the annual HMDA submissions required of most of the nation's mortgage lenders. For the first time, the disclosures for applications received in 2004 would specifically identify many of the high-cost loans that had proliferated in the risky market for "subprime" or "B-and-C" credit, so named because of the low incomes and poor credit of many borrowers unable to qualify for competitively-priced prime, A-rated loans. By November, 2004, the impending public release of preliminary data was adding new fuel to the fire of long-running public controversy over lenders' treatment of racial and ethnic minorities. For more than twenty years it has been widely recognized that African Americans (and, to a lesser extent, Latinas and Latinos) have much higher denial rates for most conventional loans, and with the growth in the subprime market it was also clear that minorities who did succeed in getting loans were much more likely than non-Hispanic Whites to receive high-cost loans, and to be targets of exploitative, "predatory" lending schemes. A growing body of research at the nexus of economics, law, and public policy also explains the paradox of lucrative profits extracted from low-income, risky borrowers: many lenders and brokers earn their revenue from immediate up-front fees, while longer-term risks are distributed through complex securities pathways when the loans are packaged and sold to investors in varied risk "tranches"; in a climate of low interest rates and rising home prices, repeated refinancing with the same borrower to pull out multiple rounds of fees --

equity stripping -- is just one of the many ways that profits can continue to flow even as borrowers sink further into debt until eventual foreclosure (see Calem et al., 2004; Engel and McCoy, 2002, 2004; Howell, 2006; Immergluck, 2004; and Renuart's [2004] frightening chart, "How to Eliminate Home Equity in Four Easy Steps," p. 486). Nevertheless, despite this growing body of knowledge, until the release of the 2004 HMDA there were few consistent ways to track racial inequalities in high-cost loans; the industry's partisans disputed all definitions of predatory and dismissed the multitude of documented cases of abuse and deceptive practices as anecdotal. The new data promised to alter this debate. To be sure, the new data had significant limitations. Loans are reported as high-cost only if they meet specified "rate-spread" triggers (total interest and finance charges three percentage points above comparable Treasury yields for first-lien loans, five points for subordinate liens); moreover, lenders had successfully fought community organizations' demands to report applicant credit scores, a factor that lenders and conservative analysts never fail to cite to justify minorities' greater denial rates and segmentation into high-cost credit. Now the industry lobbyists in Washington were hard at work formulating media strategies to challenge the new HMDA data precisely because it did not include credit scores (see also Immergluck, 2004, pp. 218-219). One of the trade group presidents complained to a reporter for the *American Banker* that the absence of credit history data meant that "People are going to take this data and draw alarmist and incorrect conclusions with this without complete information." (Paletta, 2004). Regulatory counsel for another trade group described the strategy: "What we don't want is one group that is saying something that is slightly different from what another group says." (Paletta, 2004).

The fears of the lobbyists meeting in Washington in November, 2004 were justified. The next few years brought a growing wave of intense press coverage, fair-housing litigation, well-orchestrated activist protest, and high-impact scholarly research on

subprime lending, racial credit discrimination, and predatory financial practices (Avery et al., 2005; Engel and McCoy, 2004; Immergluck, 2004). Even in the prevailing pro-industry climate of Bush's Washington, there were signs of belated regulatory wake-up calls. Based on the 2004 HMDA data, the Federal Reserve Board found sufficient statistical significance in the lending patterns of 200 institutions to undertake referrals for further regulatory examination. The 2005 data posted a 70 percent jump in the number of subprime originations, and showed that 54.7 percent of African American homebuyers received high-cost loans, compared to 17.2 percent of Non-Hispanic Whites; analysis of the 2005 HMDA led the Federal Reserve to refer 270 lenders for investigation. (*Origination News*, 2006, p. 81).[1]

The ideological factories built to manufacture consent along K Street, Washington's famous lobbyist corridor, worked to insulate the home finance industry from the increased political and regulatory fallout at the federal level. But the financial politics of state legislatures and Wall Street presented different challenges. In early 2005, then New York Attorney General Eliot Spitzer began an investigation into the severe racial disparities apparent from the HMDA reported by several large national lenders under his jurisdiction: Citigroup, JP Morgan Chase, Wells Fargo, and HSBC (Parker, 2005). Spitzer's request was narrowly tailored to obtain exactly that kind of internal underwriting data (including applicant credit history) that lenders always cite as justification for the severe racial inequalities visible in their public HMDA disclosures; Spitzer was, in other words, asking the banks to share the information that would exonerate them on charges of discrimination if (as they claimed) their business practices

[1] Researchers also noted that "piggyback" loans -- first- and second-lien originations made simultaneously to help a borrower qualify for an expensive purchase while avoiding mortgage insurance -- were increasing particularly fast for higher-income borrowers seeking loans for properties in lower-income neighborhoods: "...HMDA appears to show that investors as well as homebueyers are taking out piggyback loans to purchase homes in neighborhoods going through the gentrification process." (*Origination News*, 2006, p. 81).

had no disparate racial impacts. After several weeks of stonewalling, the four lenders had their trade group (the Clearing House Association) file suit against Spitzer. The federal Office of the Comptroller of the Currency filed a separate complaint against Spitzer's investigation. Eventually, the two complaints were consolidated, and in a pair of opinions issued by the U.S. District Court in Manhattan, Spitzer was ordered to abandon his pursuit of the lenders' internal data. Such information-gathering was defined as regulatory "visitation" and thus an exclusively federal prerogative under the National Bank Act of 1864 (Stein, 2005).

But one of the protagonists escaping from Spitzer's HMDA investigation would eventually confront the much more powerful discipline of the global financial markets. HSBC, the upscale British banking empire, had only appeared on Spitzer's radar screen because of its acquisition of Household International, the notorious and single largest subprime originator in the U.S. When announced in late 2002, the $14.2 billion deal shocked analysts who had not fully grasped the appeal of subprime profits for even the most elite, gold-plated bank emblems: "I think of HSBC as a very Presbyterian company -- squeaky clean," quipped one surprised analyst, while another explained that "Basically, this is all about capital." (Sorkin, 2002, p. C10). Wall Street's romance with the high profits of subprime lending flowered through the housing boom, as long as steadily rising home prices masked the deteriorating finances of maxed-out homeowners. But in 2006 the market turned as hundreds of thousands of adjustable-rate teaser loans re-set to higher payments just as home prices stagnated and fell in many markets. By the third quarter, 12.6 percent of all subprime loans were more than 30 days delinquent, and a barrage of negative earnings reports hammered the stock prices of major subprime lenders (Twiddy, 2007). By one estimate, foreclosures jumped 42 percent between 2005 and 2006 (data cited by Sen. Christopher Dodd, *CBC News*, 2007). In early February, 2007, HSBC became the latest and most prominent company

to warn investors about its subprime romance gone sour, signaling that it was boosting its loan-loss reserves by 20 percent, to $1.76 billion. HSBC officials tried to calm investors unnerved by the "unprecedented profit warning" (Tam, 2007) by emphasizing that the earnings risks were confined to U.S. operations -- and more specifically, to the sooner-than-expected defaults of subprime notes originated in 2006. London analysts were unconvinced, and Wall Street pundits grew even more suspicious. HSBC announced a management shakeup, and in a departure from its usual practice of declaring earnings separately in London and Hong Kong, the Chairman and Chief Executive planned to meet in London for the high-stakes earnings announcement (Tam, 2007). HSBC is Europe's largest bank, but suddenly its position as the second-largest U.S. subprime lender made it the poster child for the financial press chronicles of irresponsible lending. And so when rumors of a Chinese government crackdown on debt-financed stock purchases spurred a nine percent nosedive on the Shanghai index on February 27, a day after former Federal Reserve Chair Alan Greenspan uttered the word "recession" in a private chat by satellite with an investor group in Hong Kong (Andrews, 2007a), analysts cited the spreading risks of the subprime market to explain Wall Street's 415 point slide in the Dow (Andrews, 2007b). The *New York Times*' breathless lead -- "Stock markets around the world plummeted yesterday in a wave of selling ..." was followed only a few paragraphs later by the diagnosis that "In America, the selling seemed to add to worries that a decline in the housing market, and problems in particular with loans to risky borrowers, could spill over." (Norris and Peters, 2007, p. A1). The same day, Freddie Mac announced a further tightening of its criteria for purchasing bonds backed by subprime loans (Bajaj, 2007). Lukewarm results the next day calmed fears of a wholesale transnational market meltdown, but unease persisted: "One important concern -- that Wall Street's bet on home loans to people with weak, or subprime, credit is souring quickly as defaults rise and home prices weaken -- has not gone away." (Anderson and Bajaj, 2007, p. C1).

Remarkably, in a very few years, "subprime" and "predatory" mortgage lending had moved from the specialized domain of housing research, banking regulation, and the marginalized voices of civil rights activism to front-page, above-the-fold coverage of the fears of millions of investors. Federal Reserve Chairman Ben Bernanke had to reassure members of the House Budget Committee that problems in the subprime sector gave no sign of bleeding into the broader housing and financial markets (Andrews, 2007a). But other observers were more troubled by the volume of subprime credit ($600 billion in new loans in 2006, a quarter of all mortgages issued that year) and the exposure of deep-pocket investment banks to the dangers of rising delinquency, default, and foreclosure. One analyst told the *Times*, "It is impossible to get a number" to gauge the investment banks' subprime vulnerability. "...And I don't think they even know." (quoted in Anderson and Bajaj, 2007, p. C1).

London. Washington. New York. Wall Street. Hong Kong. The bylines read like the roster of globalization and world-cities research, an area of inquiry that has burgeoned over the last two decades to transform our understanding of urbanization, transnational relations, and geographical scale (Cox, 1993, 1998; Friedmann, 1982; Knox and Taylor, 1995; Sassen, 2001, 2002; Smith, 1998, 2001; Taylor, 2003; and hundreds of publications produced through the GAWC network, GAWC, 2007). But if the business-press narratives of predatory lending suggest a global-city hierarchy -- centered, perhaps, on New York as the capital of capital and Washington, DC as the pre-eminent political "metropolitan talk machine" (cf. Thrift, 2004) -- then we should be wary of the dangerous top-down bias of the world-cities literature, with its obsessive and often misleading fascination over New York, London, Tokyo, and other cities aspiring to join the triad.

What about the "black holes" -- the cities bypassed by the familiar indicators of global capital investment, or simply overlooked, ignored, and relegated to invisibility when trends are summarized at the regional or national level (Short, 2004)? What about the mundane, ordinary places that shoot to the top of the rankings when we choose indicators of the worst kinds of things? Because if we simply tabulate the incidence of rate-spread loans reported in the HMDA data that so concerned those lobbyists meeting in Washington, we see a striking and unfamiliar urban hierarchy (Table 1). In the home purchase market, the nation's capital for subprime capital is McAllen, Texas, where 42.1 percent of all homebuyers received rate-spread loans. "Many areas of the United States look for distinctiveness in ways that portray them as 'Number One,'" begins a report from researchers at the University of Texas-Pan American, but this region earns first-class status on a troubling suite of benchmarks -- highest unemployment, lowest per capita income, highest volume of border drug seizures, greatest concentration of low-income enclaves (*colonias*) housing the nation's largest population of migrant farm workers (Richarson and Pagan, 2002, p. 2). In the home improvement market, the peak of the subprime hierarchy is Dothan, Alabama, once cited in passing by Reynolds Farley as a place so poor (with such a low cost of living) that anyone living there who was fortunate enough to have an income at the federal poverty line could actually expect a reasonable standard of living (cited in Jennings, 1994, p. 12). In the refinance market, subprime lenders' global city is Hinesville-Fort Stewart, Georgia, a town half an hour southwest of Savannah that is home to the Army's largest installation east of the Mississippi; service members and their families account for about two-thirds of Hinesville's population (Surran, 2007).

In this paper, we seek to explore these oft-overlooked cities and regions -- the ordinary places where the experiences of millions of homeowners and homebuyers are at least partly shaped by the decisions of investment bankers and securitization consultants on

Wall Street, by the strategies of the lobbyists who met in Washington to plan their response to the anticipated bad news from the new HMDA, and by legislators negotiating the multiplicity of competing interests in the politics of profit, regulation, disclosure, and equity. Our empirical analysis centers directly on the 2004 HMDA records themselves. HMDA plays a central role in a vast, interdisciplinary literature on mortgage market inequalities, and hundreds of researchers have analyzed these data for various years and at different scales (e.g., Calem et al., 2004; Dymski, 1999; Holloway, 1998; Immergluck, 2004; Ross and Yinger, 2002; Williams et al., 2005). With few exceptions, though, either ignore geography by casual aggregation (or through the dismissive use of dummies or "fixed effects" to control for -- i.e., suppress -- geographical variation) or opt for in-depth studies of individual states, cities, or neighborhoods. Relatively little is known about the meso-scale, middle-ground -- about the overall prevalence of mortgage market inequalities throughout the national urban system, in which hundreds of metropolitan areas, and many thousands of neighborhood housing markets, are integrated into the economics and politics of capital investment and regulation at the state, national, and transnational scales. And so our exploration of the 2004 HMDA, with its new loan-pricing information, is motivated by these kinds of questions: What does the landscape of subprime and predatory lending[2] look like if the view is shaped not only by the global-cities view of Wall Street and

[2] Although we use both "subprime" and "predatory" throughout this paper, we do recognize that subprime credit does serve a legitimate need for many borrowers unable to meet the underwriting requirements of mainstream, prime lenders. In previous years these borrowers were excluded from formal credit markets, whereas today they can obtain loans if they are willing to pay higher borrowing costs. Yet the subprime sector provides fertile ground for a wide range of undisputably abusive and deceptive practices, and industry partisans often defend predatory practices simply by sowing terminological confusion and rejecting all attempts to define predatory. The task of empirically separating legitimate subprime and predatory loans in the HMDA is beyond the scope of our analysis in this paper, but we do maintain that high market shares for rate-spread products do suggest problems. For a clear, rigorous set of criteria to define predatory market relations, see Engel and McCoy (2002).

Table 1. Metropolitan Areas with Greatest Share of Rate-Spread Mortgage Loans, 2004.

Home Purchase

McAllen-Edinburg-Pharr, Texas	42.1
Odessa, Texas	40.9
Hinesville-Fort Stewart, Georgia	39.9
Laredo, Texas	39.4
Alexandria, Louisiana	37.4
Detroit-Livonia-Dearborn, Michigan	37.1
Pine Bluff, Arkansas	36.5
Jackson, Mississippi	34.8
Brownsville-Harlingen, Texas	33.6
Sumter, South Carolina	32.0

Home Improvement

Dothan, Alabama	46.6
Greenville, North Carolina	44.8
Tuscaloosa, Alabama	44.1
Odessa, Texas	40.5
Valdosta, Georgia	39.8
Kennewick-Richland-Pasco, Washington	38.2
Macon, Georgia	38.1
Athens-Clarke County, Georgia	38.1
Rocky Mount, North Carolina	37.8
Albany, Georgia	37.8

Refinance

Hinesville-Fort Stewart, Georgia	45.6
McAllen-Edinburg-Pharr, Texas	41.8
Brownsville-Harlingen, Texas	41.2
Odessa, Texas	40.9
Pine Bluff, Arkansas	39.4
Laredo, Texas	37.9
Lawton, Oklahoma	35.8
Fort Smith, Arkansas-Oklahoma	35.0
San Angelo, Texas	34.7
El Paso, Texas	34.3

Data Source: FFIEC (2005).

Capitol Hill, but also by an earlier generation of research on cities as systems within systems of cities (Berry, 1964)? What would the American urban system look like if we used the data that so troubled those Washington lobbyists, and that inspired Spitzer's

failed attempt to hold banking empires accountable, to produce a contemporary version of Brian J.L. Berry's (1972) *City Classification Handbook*? And what are the results of a large, diverse Community Reinvestment Movement, with activists and attorneys working at different scales to challenge the scourge of predatory lending? Have their efforts led to any successes in changing the nation's urban system of financial exploitation?

The rest of our analytical narrative proceeds in five sections. First, given the central, controversial role of classification and related statistical techniques in the classical urban systems literature, we explain why we believe these modes of analysis hold promise as strategic tools for mapping and mobilization. Next, we use a few of the standard urban-systems techniques (augmented with short interpretive vignettes) to classify all of the nation's metropolitan areas according to their penetration by subprime mortgage capital. Next, we replicate this analysis at the census tract scale. We then analyze the interplay between these neighborhood and metropolitan geographies and legal developments in state legislatures, where most of the recent efforts to fight predatory exploitation have achieved success; we use a blend of multivariate taxonomy and logit regression to measure the results of the Community Reinvestment Movement's work on the likelihood that borrowers will be saddled with high-cost subprime loans. In the final section we summarize our findings and the implications for analysis and activism.

Linnaeus to Lunatics: Classification, Cities, and Communities

> "At that time, all computations had to be done by hand; Tryon was later to speak of his mis-spent youth, because too much of his time had been spent with a desk calculator. In the 1950s the practice of cluster analysis was restated in computer terms to enable the investigator to escape from hand

> calculations. Tryon and Bailey therefore planned this book to be the definitive account of postcomputer cluster analysis. The manuscript was almost finished when Tryon died suddenly in 1967." Charles Wrigley (1970, p. v.)

Our goals in this paper are to explore the landscapes of subprime and predatory home lending in the American urban system, to classify the different kinds of local credit regimes created by the dynamics of mortgage capital, and to develop a series of taxonomies that have some relevance to researchers, regulators, and organizers working in the Community Reinvestment and Fair Lending movements (AFFIL, 2007; Squires, 2003, 2004). But classification and taxonomy have become quite controversial -- even as these practices have become so pervasive that they are almost hidden in plain sight, practiced not by scholars laboring with "desk calculators" but by automated software bots sifting through streams of data on the lives of consumers, workers, voters, patients, donors, children, families, travelers, and so many other fragmented shards of the "digital individuals" (Curry, 1997) created by the information society. Before we go any further, therefore, we wish to explain why we are willing to accept the risks of this approach.

The essence of classification -- separating things into different categories based on various characteristics of those things -- changed little from the time of Aristotle through the eras of Carolus Linnaeus and Charles Darwin; what made the work of Linnaeus and Darwin revolutionary was not the principle, but its application to new kinds of questions and processes. The work of Karl Pearson and Charles Spearman in the early twentieth century, though, created a formal mathematics of classification, allowing the practice to proliferate with the development of factor analysis and other permutations of correlation analysis in the 1930s. The approach spread rapidly in

psychology and other fields with an interest in individual-level behavioral themes, but it also played a prominent role in the portrayal of *places* as objects ready to be categorized: Robert C. Tryon, a psychologist at Berkeley and one of the leading figures in the development of the methodology, deployed it to make sense of the new census data for more than three hundred neighborhood areas (census "tracts") in the San Francisco Bay Area (compare Tryon, 1955, with Shevky and Bell, 1954). The impulse to classify regions, cities, and neighborhoods swept through vast areas of geography, sociology, and planning in the 1960s, as formalized statistical frameworks and the development of the digital computer allowed analysts to provide new kinds of engagements between abstract-deductive theory, empirical hypothesis-testing, and inductive exploration (Abler, Adams, and Gould, 1971; Berry, 1964; Berry and Kasarda, 1977). Indeed, much of the urban literature of that era could be understood as a computer-assisted, statistical-intensive reworking of a previous generation of interpretive, qualitative ways of classifying cities and urban processes (see Harris, 1943, and Nelson, 1955). Yet automation in these years was itself a vocation of highly skilled craft labor, and Tryon's mis-spent youth led to late-middle-age frustrations with the destabilizing creative destruction wrought by advances in computer hardware and software. Daniel Bailey, one of Tryon's students and collaborators, reflected that

> "All of these changes have been painful to a certain extent .... We went from the IBM 701 to the IBM 704, to the IBM 7090, the IBM 7094, to the CDC 6400 and at Colorado from the 7090 to the IMB 709. ... changes in computer operating systems and programming languages have been more frequent than changes in computer. As a consequence, the productive work is somewhat less than half of what would have been accomplished under stable computer conditions. Perhaps that is progress, but it reminds one of the pioneers who struck out due west only to have to keep

> changing their route because of impassable mountain ranges and deserts." (Bailey, 1970, p. xiii.)

For those willing to endure the logistical and administrative challenges, though, classification-oriented cluster analysis soon became an indispensable instrument in the toolbox of general linear model statistical inference, and helped analysts organize a growing volume of governmental information about industries, regions, cities, and neighborhoods. The movement attained its pinnacle with the 1972 publication of the *City Classification Handbook*, a collected edited by Brian J.L. Berry and featuring contributions by Terry Nichols Clark, Leslie King, Robert Murdie, Leo Schnore, and several other urbanists of past or future fame and fortune (Berry, 1972). But even at this watershed moment, much of the analytical optimism was tempered by a realization that classification might never deliver the Kuhnian paradigm shifts sought by so many in the new generation of geographers. The first lines of Berry's introductory essay were uncharacteristically cautious and modest:

> "Why should anyone be interested in classifying cities? To those of an unremittingly scientific frame of mind classificatory exercises are at best limited, a primitive beginning beyond which, they feel, social science has developed. Yet it is equally true that we would never have learned anything if we had never thought how objects resemble each other, and whether they manifest the same properties. If every object in the world were taken as distinct and unique, our perception of the world would disintegrate into complete meaninglessness. The purpose of classification is to give order to the things we experience. We classify things so that we may learn more about them." (Berry, 1972, p. 1).

Three decades before Berry found himself irretrievably under siege from a generation influenced by poststructuralism (which he certainly did regard as disintegration "into complete meaninglessness"), he felt the need to defend inductive statistical techniques, and even a certain amount of good old-fashioned urban-regional *description* -- to those hardcore scientists concerned with the urban only insofar as it reflected one "universally true typology." (Berry, 1972, p. 2). "If such a true typology existed," Berry pointed out, "there has surely been enough urban research in the past century for it to have revealed itself by now." (Berry, 1972, p.2).

Still, even the best contextualized descriptive research became more difficult and unpopular in the years after the *City Classification Handbook*. Methodological innovation in the mathematics and inferential statistical aspects of cluster analysis led to a dizzying array of new clustering algorithms. Each produced a different clustering solution, seemingly valid according to its own particular routines of hierarchical agglomeration (putting similar things together in progressively larger groups) or non-hierarchical partitioning (dividing an entire set of observations into a specified number of groups). Which algorithm do we use? Why? How can we determine the correct or optimal classification for complex human creations like cities, which have no clear *a priori* criteria to tell us how many "real" categories to look for in the messy confusion of imperfect, limited empirical measures we have available?

These troubling foundational questions could not be ignored. Even as the pragmatic utility of cluster analysis made it increasingly popular in geo-demographic analysis, marketing, and a wide range of other applied industry studies, it acquired pariah status in social-science fields concerned with positivist explanation and then non-positivist epistemological commitments. The most devastating critique came not from post-positivist critical social theory, however, but from Peter R. Gould, a geographer with

considerable mathematical expertise. In an essay first published in a 1981 collection titled *Future Trends in Geomathematics* and revised for a more biographical volume published shortly before his death (*Becoming a Geographer*), Gould dismantled the analytical and interpretive illusions created by the mechanical procedures of "partitional thinking." Gould charged that cluster analysis severed the connections between things, that it obscured underlying relations of context, spatial location, and process, and that the first steps of choosing variables had the effect of defining and creating the space of observation and interpretations. All the reams of numerical output produced by the mindless iteration of whatever algorithm was chosen had no real meaning, then, but helped to sustain a dangerous tautology.

Gould developed a pedagogical example from the work of geologists studying the distribution of *foraminifera*, tiny organisms with skeletons of calcium carbonate that accumulate in sedimentary rock sea-beds. Gould scrutinized the categories produced by Graeme Bonham-Carter in the 1960s, who had adapted data from samples taken by another geologist, Jacob Houbolt, in the Persian Gulf during the 1950s; Bonham-Carter's concern was to sift through Houbolt's field observations "as a concrete example of how to use the new computerized clustering algorithm that was then all the rage." (Gould, 1999, p. 295). Gould explained the multiple biases that crept into Bonham-Carter's selective, flawed analysis of the original data, and the ultimate verdict on the clustering approach is unequivocal and unforgiving:

> "...what we have here is a piece of algorithmic partitional nonsense. The process reminds one of a lunatic hacking apart a pumpkin with a broadaxe, and notice how intellectually seductive the results are. Points that are close together in the pieces hacked apart were definitely close together in the pumpkin, no matter *where* the cuts where made. Because

> one fact is tautologically indisputable, given our original, tightly connected 'foraminifera pumpkin': No matter what clustering routine is applied, points close together in the space (pumpkin) will often appear in the same groups (pieces hacked apart). But the real question is whether we should be hacking around with pumpkins in the first place." (Gould, 1999, p. 298).

Gould's image of the lunatic and the pumpkin offer a sobering reminder of the dangers of automated statistical algorithms. Yet there are at least four reasons to reconsider the harsh verdict on classification-oriented cluster analysis. First, the weaknesses of multivariate numerical taxonomy for causal explanation are precisely those features most investigators consider crucial for rigorous *description*: the approach is flexible and versatile, and is readily suited to messy, confusing jumbles of information about new things or relationships that may not conform to any neatly-packaged conventional wisdom. In other words, classification and cluster analysis can still provide considerable insight with samples that depart from multivariate normality, and in situations where it is not entirely clear whether the underlying causal relations involve (non)linear or (non)recursive linkages. Taxonomic procedures simply divide the observations in a dataset according to any number of variables describing each phenomenon (Q mode) or distinguish variables on the basis of the observations they measure (R mode). Second, no particular classification method is inherently superior or correct: there are only different methods and solutions, and it is the investigator's choice which one to use in a given situation. Although there are multiple statistical benchmarks to measure different cluster solutions from separate algorithms, in the end, any use of the method is inescapably qualitative -- and thus requires and allows care, subjectivity, and judgment. Amidst the pitched battles of geography's quantitative revolution thirty years ago, the objectivity/subjectivity divide marked out the trenches

of hostile territory among influential, interdisciplinary paradigms. But if we are prepared to accept the interplay and interdependence of subjective interpretation tempered by formalized hypothesis testing, then the variety of clustering algorithms developed over the last forty years replaces bewildering confusion with a menu of possibility and creativity. In this sense, the enterprise of taxonomy neatly encapsulates a broader shift in the conditions of possibility for quantitative spatial analysis in general -- from an assumed position of privilege in the 1960s search for universal laws of spatial relations, to a more pluralist regime today marked by what Jessie Poon (2003, 2004, 2005) aptly describes as "methodological legislation." The inescapably subjective contingencies of this legislative process are quite clear to many of the specialists (mostly outside the social sciences) who continue work refining various clustering methodologies (e.g., Tibshirani and Walther, 2005; Tibshirani et al., 2001; Finch, 2005).

Third, cluster analysis is especially well suited to viewing observations from different perspectives. The connections severed by Gould's pumpkin-hacking lunatic are indeed troubling if they distract us from underlying processes, causal interdependencies, or genealogical ties among various phenomena. But the brilliance of Gould's narrative emerges through his juxtaposition of a superficial taxonomic exercise alongside a contextual, geographical analysis of *where* things happened -- explaining the processes that produced the connections between seemingly separate observations. But in many circumstances, we do want to sever connections for a moment, to see how McAllen, Texas is connected to Dothan, Alabama, and Hinesville, Georgia. We'll miss these connections if we focus solely on proximity and regional setting. Classification and cluster analysis allow us to define these connections in new and different ways.

Finally, a fourth reason to consider the approach involves questions of meaning and epistemology. The choice of variables defines the multiple-dimensional space of

observation and measurement -- creating the bounds of statistical meaning that frame every subsequent step of whatever clustering algorithm we might consider. Since social-science data are always partial, imperfect, and contested creations that falsely claim to reflect an objective reality, the argument goes, the space within which the analysis take place is automatically and epistemologically suspect: neutral, objective, value-free statements about the external world are utterly impossible in a space created by the investigator's construction of the dimensional axes of two, three, four ... however many dimensions (s)he decides. But who wants to analyze anything stripped of all values, meaning, and human significance? Despite repeated caricatures of "positivist" geography (see especially Rob Kitchin's 2006 re-run of the tired old debates, and his assessment that "unreconstructed positivist geography is secure" thanks to the market demand for GIS) many scientific geographers have been deeply influenced by non-positivist epistemologies (see Poon, 2005 for a review). But to say that science is constructed, contested, and negotiated is not particularly helpful *if that's where the critique ends*; some constructions are more useful and appropriate than others, and some constructions are unquestionably dangerous (see Latour's 2004 reaction to the manufactured uncertainty of the Republican operative Frank Luntz). And so the inescapable construction of the spaces defining cluster analysis -- and indeed all general linear model inferential statistical procedures -- does not automatically invalidate the approach. Instead, critical constructivist insights force us to accept responsibility for defining and creating certain spaces, observing and measuring some things and not others, and drawing particular connections that we judge to be important. In this paper, such epistemological considerations are especially important. The notion of "laws" in positivistic geography (Kitchin, 2006) suddenly imply different things if we consider Poon's (2003, 2004, 2005) formulation of methodological legislation. We are not in search of physics-like laws of economics or space; but we do care very much about the legal work done by those lobbyists in Washington, DC, as well as by

progressive attorneys pursuing discriminatory and predatory lenders (Relman, 2004), and by all the groups and individuals involved in the passage of legislation to protect consumers from this new breed of "Loan Sharks in Pinstripes" (Page, 2004). Cooperation, competition, and conflict among all of these different actors helps to define the spaces in which mortgage lending takes place: indeed, the organization and activism of the Community Reinvestment Movement created HMDA in the 1970s, making it possible to use statistical methods to describe, analyze, and mobilize against interests who could previously hide behind the cloak of (statistical) invisibility. And, as we will see, recent progressive moves to challenge the rules of the game have begun to have measurable effects on the unequal segmentation of some borrowers into the higher-cost, higher-risk subprime loan channel.

Mobilizing *Mesos*

Choosing a scale of analysis is a crucial first commitment in the design of any kind of social research. Confronted with this important initial decision, most investigators choose one of two very different paths: studying a few things in great detail at close range and perhaps over a long period of time, or studying many things (either qualitatively or quantitatively) in ways that allow broad generalizations and abstractions. These two paths roughly correspond to Massey and Meegan's (1985) distinction between extensive and intensive research, although we would dispute the way they intertwined dichotomies of scale and method (extensive=quantitative, intensive=qualitative). Unfortunately, regardless of method, scale choices often obscure the middle-range realm of analysis, where the challenge is to pay careful attention to a few things while placing them in the context of many large-scale events or processes that we must summarize. *Mesos* matters, and nowhere is this more important than in the realm of American housing finance, where trading in mortgage-backed securities

now exceeds that of the U.S. Treasury securities market. It is easy to see what is happening in the local housing market in our neighborhood or city, and it is not too difficult to keep up with the streaming headlines from Wall Street or the seemingly abstract space of flows (Castells, 1997) of the global stock exchanges. But hidden in plain sight is the *mesos* of many specific places that are systematically linked together in large-scale economic and political processes that stretch far beyond the capacity for direct engagement in Massey and Meegan's (1985) vision for 'intensive' research. As a consequence, research and policy in the Community Reinvestment Movement has (with a few exceptions, especially Li and Ernst, 2006) split into separate narratives: one describes particular *places*; the other describes detailed *processe*s (financial, political, regulatory) at the broad, national level. But subprime and predatory lending are quintessentially meso-scale processes, in which the intimate, intensive local knowledge of loan officers and brokers is bound up with the higher-scale, extensive abstract views of regional lending managers, national-bank strategists and portfolio analysts, and Wall Street mortgage-backed securities advisors, attorneys, and traders. Together, all of these actors work to create and profit from a metropolitan urban system of subprime and predatory mortgage capital.

To map this evolving metropolitan system, we draw on the approaches used so widely in the urban systems and factorial ecology literatures of the 1960s and 1970s (see Berry and Kasarda, 1977). We aggregated all of the single-family application records in the 2004 HMDA (approximately twenty million observations) to the metropolitan level, before calculating a handful of simple measures of regional mortgage outcomes -- denial rate, FHA market share, racial/ethnic composition of lending flows, and of course the newly-available information on high-cost, rate-spread loans. Our list of variables is deliberately short for this part of the analysis: we want to know if the mortgage market itself hints at deeper, structured regional geographies -- even if we ignore measures of

industrial structure, immigration, and all the other processes that create and reproduce housing and credit markets. The eigenvalues from a simple principal components analysis suggest retaining four leading axes, which account for a cumulative 73.2 percent of the variance of all thirteen measures across 387 metropolitan areas (Table 2). The intercorrelations among these factors and the original measures highlight several interesting aspects of regional mortgage dynamics. First, note that all of the rate-spread indicators load strongly onto the first component, with high-cost lending more prevalent in areas with greater market share for FHA-insured loans, higher conventional denial rates, and higher shares of African Americans and mobile homes. In other words, the new inequalities of subprime credit captured in the

Table 2. Ecology of Mortgage Lending in the U.S. Metropolitan System, 2004.

	Unweighted, unrotated principal components				
Variable	I	II	III	IV	Communality
FHA share of all applications	**0.572**	-0.119	0.009	0.217	0.388
Denial rate, conventional applications	**0.841**	-0.227	-0.052	-0.019	0.761
Home improvement share of all conventional applications	0.102	**-0.777**	-0.324	-0.002	0.718
Refinance share of all conventional applications	-0.086	**0.622**	0.110	**-0.503**	0.659
Mobile home share of all applications	**0.555**	0.238	-0.045	**0.594**	0.720
Non-Hispanic Black share of all applications	**0.615**	0.152	0.311	-0.356	0.625
Hispanic share of all applications	0.000	**-0.928**	0.063	-0.051	0.868
Non-Hispanic White share of all applications	-0.185	**0.771**	**-0.477**	0.247	0.917
Non-Hispanic Asian share of all applications	**-0.446**	-0.049	**0.801**	-0.005	0.844
Native American share of all applications	-0.178	0.033	**0.733**	**0.488**	0.808
Rate-spread home purchase loans, as share of all conventional home purchase originations	**0.768**	0.135	0.263	-0.200	0.718
Rate-spread home improvement loans, as share of all conventional home improvement originations	**0.734**	0.270	0.146	0.067	0.638
Rate-spread refinance loans, as share of all conventional refinance originations	**0.925**	-0.010	0.005	-0.029	0.856
Eigenvalue proportion	0.3068	0.2066	0.1323	0.0868	
Cumulative	0.3068	0.5133	0.6456	0.7324	

Note: Number of observations, 387; all data exclude records collateralized for multi-family units (more than 4 dwelling units). Loadings >0.40 shown in boldface.

enhanced disclosure data largely mirror the old inequalities of exclusion that were typically manifest in high denial rates; if we focus only on aggregate trends at the metropolitan scale, exclusionary denial by prime, conventional lenders and inclusionary exploitation by subprime and predatory lenders are two sides of the same coin. This result echoes the work of Williams et al. (2005), who found that from 1993 to 2000, up to half of the gains for minority homeownership came from the new, stratified subprime

system (see also Howell, 2006).[3] Second, racial and ethnic inequality cannot be collapsed into a simple white/other binary. The metropolitan geography of African Americans is most tightly bound up with mortgage market stratification (the first component) and highlights a pronounced contrast to the distribution of non-Hispanic Asians and Whites. Increasing White/Latino divisions, however, appear on a separate, second principal component (which also highlights a greater prevalence of home improvement in Latino metros); a third component distinguishes White/Native American regional patterns. The fourth component suggests an aggregate correlation in the regional geographies of Native Americans and the prevalence of mobile homes.

A first-cut summary of the regional geography of mortgage capital, then, might be crudely summarized in four dimensions: Black/White credit segmentation, housing-stock reinvestment and Latino growth, Asian and Native American diversity, and rural-metropolitan housing (think of the prevalence of exurban mobile homes and Reservations in and around many cities across the Plains and the Southwest). These four dimensions provide a ready starting point to suggest a classification of metropolitan mortgage markets. Right away, we encounter the enduring problem of taxonomy -- how and where to stop agglomerating (or partitioning) the observations in the vast continuum between 387 unique metropoli and one huge mega-metro cluster? The diagnostics for several different hierarchical agglomerative techniques, however, do provide some helpful guidance. Pseudo t-squared and F statistics and cubic clustering criteria (Sarle, 1983) identify locally optimal solutions at approximately ten, fifteen, and twenty categories (for average linkage, centroid, and density [3 nearest neighbor] methods) and also at 29 clusters (for the median-linkage method). Judging by

[3] As with most HMDA research up through 2004, Williams et al. (2005) proxy subprime credit by identifying loans made by institutions known to specialized in the B-and-C business (see Scheessele, 2002).

the r-squared estimate of the proportion of total variance captured within clusters (and adjusting for the number of clusters) the most efficient solutions distinguish ten separate types of metropolitan areas; unfortunately, Sarle's (1983) metric also hints at a certain degree of outlier bias as the number of clusters decreases (less than 20 for median and centroid, less than 30 for density). Nevertheless, "all the hierarchical procedures are sensitive to outliers," (Lorr, 1983, p. 120), and the statisticians' advice achieves mathematical purity only by means of geographical violence -- remove the outliers. Outlier is just another word for unique, and removing these cases is only logical if the observations represent aberrant samples or repeated measures of the same kind of phenomenon. Accordingly, we avoid removing outliers; instead, we embrace their relevance by turning to another classification procedure (nearest-centroid sorting) with a sensitivity to outliers that tends to yield single-member categories when the data justify such an outcome (SAS Institute, 1999, pp. 1195-1197).

Metropolitan Clusters

If we want to summarize about seven-tenths of the variance in our composite measures of mortgage market outcomes, then, we can do so by grouping the nation's 387 metropolitan areas into ten categories. Clearly, our choice of variables establishes the space of observation, and so it should not be surprising that the analysis captures the broad regional divisions of race and ethnicity. Summary measures are presented alongside our interpretive labels in Table 4. The most striking initial impressions highlight several groups of unusual or exceptional cases -- cities rarely mentioned in the predatory lending debates, or so statistically unique that they stand alone. Honolulu is separated out by the clustering procedure on the basis of the high share of applicants identifying themselves as Asian or Pacific Islander; but rate-spread lending does not appear to be a problem here at the metropolitan scale. Farmington, New Mexico is

another matter: a tenth of all applicants identify themselves as Native American (far beyond the share in any other metropolitan area), thanks to Farmington's situation on the eastern edge of the 17-million acre Navajo Nation. Unfortunately, high-cost lending is pervasive in the Farmington area (a fifth of home purchase loans, more than a quarter of renovations and refinances). In 1995 the Navajo Nation passed legislation to allow off-reservation banks to foreclose on delinquent mortgagors, and a few years later the First National Bank of Farmington became the first conventional lender to establish a bank branch on the reservation and to close a HUD Section 184 loan (see Listokin et al., 2000, pp. 179-192). In the case of Puerto Rico -- clearly picked out by the clustering routine on the basis of the dominance of Hispanic borrowers -- rate-spread lending is surprisingly rare (less than 4 percent of home purchase loans, about 15 percent of refinance loans). Indeed, it is a striking paradox that Puerto Rico has been covered by HMDA for years, but the place is always ignored except for studies of Hispanic lending in U.S. cities with large communities of Puerto Ricans (e.g., McConnell et al., 2005). Although some large U.S. lenders (notably Wells Fargo) have been involved in usurious practices on the island (see Lee, 2007) the overall figures for 2004 suggest few market-wide problems. Remarkably, the largest bank on the island (Banco Popular) encountered its greatest risks not in Puerto Rico but in its acquisition of subprime originators on the mainland (Reuters, 2007; cf. Cervantes and Shimkus, 2007). The final small, exceptional cluster includes McAllen, Texas, that border metropolis of colonias and migrant farm workers that suffers from the nation's highest subprime market penetration in the home purchase sector; this group of Border Latino Exclusion cities is dominated by Texas metropoli -- Houston, San Antonio, El Paso, Dallas, Laredo -- but also includes Miami, Yuma, Arizona, El Centro, California, and Bakersfield, California.

Table 4. A Taxonomy of the U.S. Subprime Mortgage Urban System.

Cluster Interpretation	No. of Metros	FHA Rate	Denial Rate	Home improvement	Refinance	Mobile Home	Race/ethnicity, of all conventional applicants					Rate-spread share		
							Black	Hispanic	White	Asian	Native American	Purchase	Improvement	Refinance
1 Border cities of Latino Exploitation														
Houston, Miami, El Centro, San Antonio, El Paso…Laredo, McAllen, Texas	14	0.080	0.291	0.107	0.547	0.026	0.038	0.449	0.294	0.015	0.006	0.245	0.211	0.286
2 Puerto Rico														
San Germain, Mayaguez, Ponce, Aguadilla, Fajardo, Guayama, Yauco, San Juan, PR	8	0.065	0.287	0.383	0.355	0.003	0.000	0.937	0.006	0.001	0.000	0.037	0.083	0.152
3 White Metros of Prime Capital (I)														
Lexingon, KY, York, PA, Springfield, IL, Peoria, IL …. Utica, NY, Santa Rosa, CA, Cambridge, MA	110	0.038	0.209	0.104	0.605	0.022	0.030	0.040	0.718	0.015	0.005	0.126	0.136	0.154
4 Metros of Average White/Black Inequality														
Indianapolis, South Bend, Kankakee, Ga, Rome, GA, Toledo, OH … New Orleans, Tacoma, WA	73	0.056	0.254	0.091	0.614	0.027	0.102	0.040	0.639	0.011	0.005	0.182	0.222	0.218
5 White Metros of Prime Capital (II)														
Boise, ID, Wilmington, NC, Ft. Walton Beach, FL, Columbia, MD …Flagstaff, AZ, Anchorage, AK	70	0.056	0.213	0.077	0.542	0.058	0.018	0.045	0.737	0.011	0.009	0.126	0.183	0.160
6 Farmington, NM	1	0.069	0.324	0.100	0.544	0.236	0.006	0.139	0.542	0.003	0.099	0.198	0.275	0.251
7 Black Belt Financial Exploitation	30	0.092	0.301	0.091	0.597	0.074	0.241	0.022	0.508	0.008	0.006	0.255	0.314	0.305
Montgomery, Shreveport, LA, Monroe, LA, Alexandria, LA …Hinesville, GA, Detroit, MI														
8 Large Multiracial Housing Markets	28	0.016	0.190	0.075	0.601	0.008	0.059	0.198	0.407	0.075	0.014	0.152	0.126	0.116
Salinas, CA, New York, NY, Sacramento, CA, Modesto, CA … San Francisco, San Jose														
9 Honolulu, Hawaii	1	0.023	0.133	0.051	0.568	0.000	0.014	0.033	0.271	0.358	0.132	0.113	0.122	0.077
10 Working-Class Financial Segmentation														
Sherman, TX, Little Rock, Ocala, FL, Lakeland, FL, Lafayette, LA …Morristown, TN, Odessa, TX	52	0.087	0.274	0.104	0.540	0.079	0.084	0.081	0.622	0.010	0.008	0.202	0.238	0.262

The vast majority of the nation's metropolitan areas fall into one of the remaining six categories (Table 4). Numerically, the most prevalent category consists of predominantly White metropolitan areas where mainstream mortgage capital prevails, and where FHA-insured and high-cost conventional loans are both equally rare. Although this cluster does include several populous metropolitan areas, it is most clearly exemplified by the observations nearest the cluster centroid -- smallish cities in the Midwest and the East, including Lexington, Kentucky, York, Pennsylvania, Springfield, Illinois, and Peoria, Illinois. A similar category of White metropolitan areas (distinguished primarily by higher yet still very low shares of Native American applicants and mobile home loans) includes middle-sized cities like Boise, Idaho, Wilmington, North Carolina, Columbia, Missouri, and more than five dozen others. Here, too, rate-spread lending has little market penetration, accounting for only 13 percent of home purchase originations and 16 percent of refinance originations. Similarly, rate-spread loans make up a modest share in another category, multiracial housing markets -- mostly big cities in the nation's coastal megalopoli, including New York, San Diego and Los Angeles, Washington, DC, and two dozen others. With the exception of Seattle and Las Vegas, non-Hispanic Whites constitute a minority of all home-loan applicants in every metropolitan area in this multiracial cluster -- and in the aggregate, rate-spread loans account for only 15 percent of home purchase loans, and 12 percent of refinance originations.

Subprime lending is somewhat more pervasive, however, in a group of seventy metropolitan areas marked by stark White/Black racial/ethnic divisions; rate-spread loans account for about one-fifth of all originations in these cities, and conventional denial rates top one-quarter. The roster of cities highlights scores of de-industrializing centers across the Midwest: Indianapolis, Toledo, Akron, Kansas City, Gary, Indiana, and Youngstown, Ohio. But we also find small cities across the South: Rome, Georgia,

Winston-Salem, North Carolina, Florence-Muscle Shoals, Alabama, Savannah, Georgia, and Durham, North Carolina. And New Orleans joins this cluster near the statistical periphery, a year before Hurricane Katrina and neo-conservative federal bulldozer initiatives began to remake the city's land and housing markets (Peck, 2007).

Yet the most striking result of the cluster analysis highlights the deep, sedimented regional geography produced by the American Dilemma of racial oppression (Myrdal, 1944, especially pp. 605-638). Cluster 4 stands out as a remarkable signifier of the persistently geographical dimensions of more than a century of segregation and stratification. Recall that our analysis is a deliberately simple, even naive approach -- using only a dozen or so esoteric measures of mortgage outcomes, and ignoring many other possible measures of regional housing market evolution. The analysis includes no explicit indicators of regional location or context. And yet the simple statistical partitioning of the cluster space immediately disentangles a regional geography with enormous significance and meaning. Cluster 4 is, quite simply, today's home-financing landscapes of the Black Belt that was created in the Reconstruction era -- along with Detroit, among the largest of the Northern industrial destinations for the Great Migration of Southern rural African Americans between the First and Second World Wars.[4]

This cluster includes thirty metropolitan areas. One of them is not too far from the cluster centroid in statistical terms and near the middle in geographical terms -- just

[4] It is also worth noting that Detroit is the farthest observation in this cluster from the centroid, and thus not as closely representative of the group character compared with, say, Montgomery, Alabama, or Shreveport, Louisiana. Detroit joins this cluster because of its exploitative financial indicators are, in contrast to the multiracial metropoli of New York, Chicago, and Los Angeles, not as easily diluted by large numbers of Whites and others getting good, A-rated loans. It may then be quite fair to consider the housing-finance regime of Detroit as a Northern extension of tghe kinds of inequalities that persist throughout so much of the Southern Black Belt.

beyond the southern reach of the Appalachian piedmont, equidistant from the Virginia and North Carolina valley and piedmont downs and the Mississippi floodplain cities to the west (see Figure 1). Today, almost 32 percent of conventional mortgage applicants in Albany, Georgia are rejected. Among those who do get loans, one-quarter receive rate-spread credit for home purchases, and the high-cost share rises to 34 percent in the refinance market and 38 percent for home improvement loans. At the heart of the Albany metropolitan area is Dougherty County, once the Cotton Kingdom, the Egypt of the Confederacy, where W.E.B. Du Bois undertook part of his field research for *The Souls of Black Folk*. Documenting the local imprint of the failures of Reconstruction two generations after the Civil War, and describing the precarious oppression of a sharecropping system that would soon be plowed under by mechanization, Du Bois (2003[1903], p. 92) wrote that "It is a beautiful land, this Dougherty County, west of the Flint. The forests are wonderful ... this is the 'Oakey Woods,' with its wealth of hickories, beeches, oaks, and palmettos. But a pall of debt hangs over the beautiful land; the merchants are in debt to the wholesalers, the planters are in debt to the merchants, the tenants owe the planters, and laborers bow and bend beneath the burden of it all." And the tentacles of extraction were indeed quite transnational. An old cotton plantation bought after the war by an English syndicate soon succumbed to bankruptcy; but the Black sharecropper on the edge of the estate still had to pay. "Nobody lives in the old house now, but a man comes each winter out of the north and collects his high rents." (Du Bois, 2003[1903], p. 95).

The words of Du Bois might be distant in time, but the chilling narratives of debt, usury, and hard labor in Chapter 7 of *The Souls of Black Folk*, "Of the Black Belt," serve to

Figure 1. The Black Belt of Financial Exploitation.

remind us how financial innovation reproduces antebellum racial inequality through the illusion of free choice. Many of the sharecropper lending practices described by Du Bois a century ago foreshadow the tactics of payday lenders and mortgage brokers today. And so Albany still appears in the headlines for ongoing controversies over the politics of debt. Not long ago, the *Macon Telegraph* carried a front-page article on the mounting concerns over payday lending, citing one of the customer complaints to the state insurance commissioner: a woman from Albany who went to a payday lender for a $200 loan, and received the amount as a "rebate" on a contract requiring her to pay $1,560 for Internet service -- despite the fact that "she has never operated a computer and doesn't know how." (Schance, 2003, p. A1). And not long after the passage of Georgia's anti-predatory lending law prompted credit agencies to stop rating securities backed by loans made in the state, Albany's State Senator called Fannie Mae in a failed

attempt to get clarification on the secondary purchaser's stance. During the floor debate on a measure to rewrite the law, one of the Republican Governor's floor leaders had declared that he was about to receive a letter from Freddie Mac threatening "real bad consequences" if the legislature did not rework the prior law within 48 hours. The letter never came. The *Atlanta Journal-Constitution* noted that "Invoking the names of the two government-sponsored institutions was a chilling move," (Unger, 2003, p. 1A), and it worked, culminating in a close Senate vote to weaken the law's provisions.

Neighborhood Dimensions of Subprime Capital

It should be clear that the metropolitan-level analysis has its limits, particularly in relation to aggregation bias: the very severe predatory practices in the disinvested inner cities of large cities, for example, are diluted when figures are calculated for an entire metropolitan area with its expansive wealthy and middle-class suburbs. Accordingly, we now turn to the neighborhood scale, using census tracts as an admittedly problematic proxy for the complex notion of local community.

What are the nation's worst neighborhoods for subprime lending? If we impose a simple arbitrary cutoff (subprime share of half, a total of at least 25 high-cost originations), we find 752 census tracts that can be considered epicenters of predatory activity in the home purchase market, 3 in the home improvement sector, and 793 in the refinance sector. Narrowing our focus to the very worst case of neighborhood high-cost lending nationwide in the home purchase market takes us to a slice of northwest Detroit, to a tract nestled into the south side of the curve in the Jeffries Freeway. The neighborhood appears without formal title on official maps and documents, but sits just north of Barton-McFarland. Once a predominantly Jewish neighborhood -- and thus free of the exclusionary racial deed restrictions that governed property transfers in

other parts of White Detroit -- the area attracted a growing number of Black middle-class homebuyers in the years right after World War II. By the end of the 1960s it was in the top tier of Black neighborhood incomes citywide (Sugrue, 2005, p. 202). The poor and working-class Eastside "hoods" referred to residents here as the "Elites" or "E-Lights" (Sugrue, 2005, p. 204). Four decades on, the twin demographic waves of aging homeowners and aging homes have collided with the broader trends of deindustrialization, disinvestment, and segregation. The neighborhood has escaped the very worst of the Detroit syndrome of depopulation, demolition, and abandonment; yet its eastern fringe is marred by a half-dozen blocks where at least half the homes have been razed. Financing for those homes that remain is almost universally subprime. Conventional mortgage denial rates are over a third; twenty-five of the 28 buyers who succeeded in getting conventional loans in 2004 had to accept rate-spread loans.

In the renovation loan market, far fewer tracts meet our arbitrary thresholds -- most neighborhoods only generate a small number of home improvement applications, and in any event renovation expenses are often financed when an owner renegotiates the entire loan (which is then classified as a refinance). But the nation's capitol for rate-spread home improvement loans is a Latino community on the northeast side of Lawrence, Massachusetts. In 2004, subprime loans accounted for three-quarters of all renovation originations here. In the Summer of 2006, the *Boston Globe* reported on a variety of abuses by mortgage brokers working the area (including one case of identity theft) that triggered a wave of defaults and a 180 percent increase in foreclosure filings for the city between 2004 and 2006. The *Globe* subsequently reported on allegations that brokers were routinely presenting sensitive loan information (such as the Truth in Lending Statement) only in English, skirting the State's explicit translation requirements (Samuels, 2006).

The nation's worst case for the refinance market takes us to a predominantly Black neighborhood in East Baton Rouge, Louisiana, about a mile east of the State capitol. In a tract adjoining Interstate 110 on the edge of the Mississippi floodplain, more than 90 percent of all refinance loans exceeded the rate-spread trigger in 2004. Conventional denial rates topped 43 percent, while high-cost loans account for two-third of purchase mortgages and three-fifths of renovation loans. In the Summer of 2005, two miles to the northeast at the Living Faith Christian Center, the Louisiana Attorney General and the Director of the Governor's Office of Elderly Affairs gave twin keynotes at a consumer protection workshop and credit clinic, as "one of several 'Scam Jams' being held across the state to educate the public about fraud and predatory lending practices." (*The Advocate*, 2005).

These brief statistical anecdotes are quite literally the tip of a very large iceberg: if we chose any of a dozen related but distinct alternative benchmarks, another set of neighborhoods would shoot to the top of the rankings; and in any event, our abbreviated narratives of small parts of Detroit, Lawrence, and Baton Rouge cry out for much more. We need in-depth qualitative analysis of specific neighborhoods like these, where the most obvious indicators of predatory lending are the worst. But first we need to move beyond the single dimension of a ranked list, to undertake a reconnaissance of the different kinds of neighborhood capital markets across the nation. Accordingly, we replicated the metropolitan-level analysis at the census tract level. First, we extract the four leading principal components for the matrix of lending variables for almost 53 thousand tracts. We also repeat the metropolitan ecological analysis to exclude what might reasonably be considered the distinctive political, legal, and regulatory spaces of Puerto Rico's housing markets. The resulting parallel arrays of component scores illuminate the effects of scale on aggregate, observed lending inequalities (Table 3). With few exceptions, the communalities are somewhat lower for

the tract analysis, an indication that this set of lending variables is more closely intercorrelated at higher levels of aggregation. Yet the communalities increase for the variables denoting Anglo Whites, Latinos, and Native Americans. Moreover, the pattern of component loadings is just as vivid as the metropolitan analysis. So long as we take care in the interpretation of factor structure when the configuration of variance triggers reversals in the signs for individual loadings (see Harmon, 1967), the ecology of mortgage capital is quite clear. A first dimension identifies mainstream exclusion and high-cost subprime penetration; a second axis distinguishes White/Latino contrasts, and two additional components detect other facets of the distribution of mobile homes, Native Americans, and others.

The pattern of loadings on particular factors suggests three crucial differences when we shift the scale from the regional to the neighborhood level. First, the relation between traditional redlining-exclusion and contemporary subprime market penetration is modified. The essence of the link remains the same: measured at the metro or tract level, areas with higher conventional denial rates also have greater rate-spread penetration, and this is precisely where African Americans comprise higher shares of loan applicants. But shifting from the metropolitan to the tract level dramatically reduces the first-component loadings for several other variables -- FHA share, mobile homes, and non-Hispanic Asians. The latter two measures appear on another distinct dimension of neighborhood segregation. This result implies, for example, that Asian buyers are more common in racially diverse metropolitan areas with higher denial rates and predatory penetration; but *within these metropolitan areas*, Asian buyers are not concentrated in tracts with high rates of subprime lending. For FHA-insured lending, the low communality for the tract model (0.27) and the low loadings this indicator posts across all components suggests that the program supports buyers across a wide range of different neighborhoods. At the regional scale, though, FHA market share goes hand

in hand with higher denial rates and subprime penetration. Meanwhile, the strong loading for non-Hispanic White share attests to the fundamental role of White privilege in structuring American urban inequalities (Jackson, 1985; Sugrue, 1985; Pulido, 2000). Second, the market segmentation of rate-spread loans appears more sharply defined when measured at the neighborhood scale. The rate-spread variables load solely on the first component, reflecting the jagged inequality separating White neighborhoods with low denial rates from Black communities with high denial rates and deep market penetration of predatory mortgage capital. Third, racial divisions at the metropolitan level are much more clearly tied to housing-stock variations when we examine the neighborhood scale: note that all the racial/ethnic variables load onto Component II in the metropolitan model, while at the tract level the proportion Native American highlights neighborhoods with greater shares of mobile homes and fewer refinance requests.

Table 3. Metropolitan and Neighborhood Dimensions of Predatory Lending, 2004.

Unweighted, unrotated principal components

Variable	All MAs, excluding Puerto Rico					All census tracts, excluding Puerto Rico				
	I	II	III	IV	Communality	I	II	III	IV	Communality
FHA share of all applications	**0.5723**	-0.0130	-0.0552	-0.2411	0.389	0.358	0.354	0.152	-0.022	0.277
Denial rate, conventional applications	**0.8701**	-0.0356	0.2122	-0.0401	0.805	**0.803**	0.113	0.195	-0.017	0.696
Home improvement share of all conventional applications	0.2733	-0.2748	**0.6887**	-0.2607	0.692	0.360	0.238	0.234	-0.310	0.337
Refinance share of all conventional applications	-0.1430	-0.1093	**0.4161**	**0.6671**	0.650	0.109	0.001	**-0.519**	0.235	0.337
Mobile home share of all applications	**0.5355**	-0.2082	**-0.4360**	-0.3224	0.624	0.189	0.380	**0.627**	0.223	0.623
Non-Hispanic Black share of all applications	**0.6038**	0.1441	-0.2460	**0.5572**	0.756	**0.711**	-0.115	-0.356	0.255	0.709
Hispanic share of all applications	0.1122	**0.7023**	0.3902	-0.3068	0.752	0.279	**-0.550**	0.247	**-0.605**	0.807
Non-Hispanic White share of all applications	-0.2976	**-0.8808**	-0.1396	-0.1231	0.899	**-0.638**	**0.710**	0.031	0.080	0.919
Non-Hispanic Asian share of all applications	**-0.4294**	**0.6944**	-0.1301	0.0991	0.693	-0.263	**-0.673**	0.144	0.304	0.636
Native American share of all applications	-0.1704	**0.5247**	-0.2855	-0.2658	0.456	0.006	-0.339	**0.523**	**0.539**	0.679
Rate-spread home purchase loans, as share of all conventional home purchase originations	**0.8038**	0.2316	0.1738	0.0981	0.739	**0.810**	-0.054	-0.012	0.058	0.662
Rate-spread home improvement loans, as share of all conventional home purchase originations	**0.7150**	0.0172	**-0.4491**	0.1784	0.745	**0.532**	0.123	-0.129	0.184	0.348
Rate-spread refinance loans, as share of all conventional home purchase originations	**0.9325**	-0.0317	0.0985	-0.0383	0.882	**0.836**	0.140	-0.050	0.044	0.723
Eigenvalue proportion	0.321	0.1719	0.1121	0.0938		0.2805	0.1358	0.0985	0.0816	
Cumulative	0.321	0.4929	0.6050	0.6988		0.2805	0.4168	0.5149	0.5966	

Note: Number of observations, 379 (MAs) 52,807 (tracts); excludes records collateralized for multi-family units, homes in Peurto Rico, and records with missing or invalid information for census tract or State codes.
Loadings >0.40 shown in boldface.

Subprime Urban Hierarchies

To map the national urban systems of individual neighborhoods linked into Wall Street's subprime romance, we used the principal component scores as an input to a cluster analysis of all 52,807 metropolitan census tracts. To help us decide how many distinct categories to create as a way of summarizing the extraordinary diversity of neighborhoods, we used centroid hierarchical agglomeration; this algorithm is more robust to outliers than most other hierarchical approaches, and it is less sensitive to non-normality biases than the otherwise superior Ward's minimum variance approach. Figure 2 show diagnostics for the last 300 steps of agglomeration, with the total amount of variance captured within the clusters declining as we build larger clusters. The pseudo-t-squared diagnostic is a measure of how much accuracy we lose with each step in the summary process that happens as we create clusters with more (and different) things. Large peaks in the pseudo-t-squared indicate steps that make a big difference in the tradeoff between accuracy and simplicity, and in this case there are crucial decision points at 292, 289, and 161 clusters, and then a sharp cascade beginning at 53 clusters. Clearly, subjectivity matters here: if we wanted a taxonomy that captured almost four-fifths of all the variance, we could get it in about 300 clusters. But in light of the small number of original variables and considering the lessons of Tryon's mis-spent youth, we opted for a solution at 54 clusters, with an overall r-squared of 0.569. We then used a non-hierarchical nearest centroid sorting algorithm, yielding an encouragingly robust solution.[5]

[5] The [Rsquare/(1-Rsquare)] diagnostic, which measures how well the clusters include the variance in each of the axes defining the space of observation, is between 6.67 and 7.94 for each of the four principal components.

The voluminous output from the cluster analysis is not reproduced here, but the most obvious result is the statistical separation of more than a dozen categories -- most with one, two, or three census tracts -- that have thin markets with few transactions (and thus unusual combinations of extreme percentage values). But other parts of the nation's

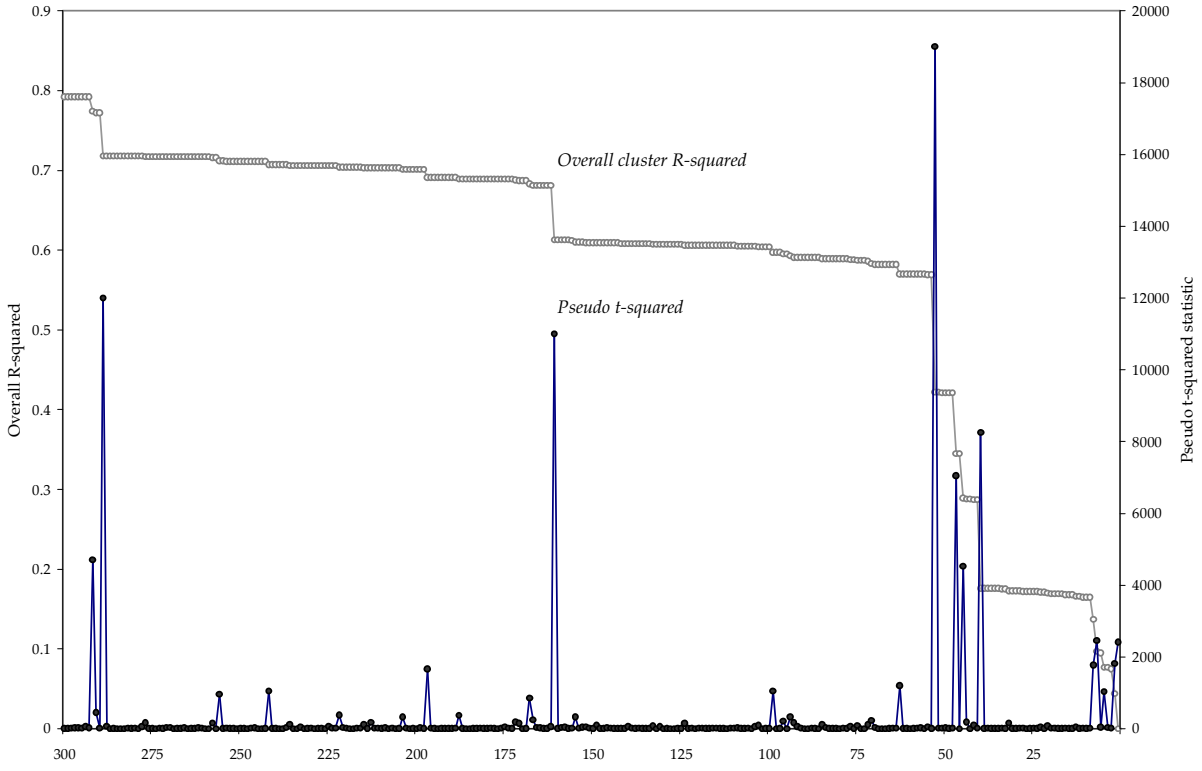


Figure 2. Diagnostics for Tract Cluster Analysis.

urban system cannot be so easily dismissed as the exceptional, rare cases of market failure in just a few neighborhoods. Consider Cluster 45, with 1,566 tracts spread across the country. Almost 515 thousand homeowners and prospective buyers filed loan requests in these neighborhoods. On average, three-fifths of the applicants in each of these communities were non-Hispanic Black, and two-fifths of all loan requests were rejected. Among those approved for home purchase loans, 56 percent received rate-spread mortgages; high-cost products accounted for 48 percent of home improvement loans, and 53 percent of refinance originations. These are precisely the kinds of

neighborhoods that are at the heart of the most serious scholarly, activist, and regulatory concerns over predatory lending: predominantly inner-city African American communities in cities (or parts of cities) hit hard by economic restructuring, racial segregation, housing disinvestment and financial exploitation. If we rank this part of the national urban system according to the number of homeowners and buyers affected by conditions in these specific neighborhoods, it would highlighted Detroit (83,268) and Chicago (56,274) at the peak; a string of eight cities between 10 thousand and 50 thousand (in descending order, Atlanta, Memphis, St. Louis, Birmingham, Alabama, Baltimore, New Orleans, Cleveland, and Milwaukee); and several dozen smaller concentrations in Kansas City, Jacksonville, Florida, Baton Rouge, Dallas, Washington, DC, Indianapolis, and so on.

By contrast, Cluster 14 identifies landscapes of Latina and Latino exploitation across the Southwest. Together, the 471 tracts in this group had 101,135 single-family loan applications in 2004. On average, two-thirds of the applicants in each neighborhood identified themselves as Hispanic. Fully 45 percent of all requests were rejected, and subprime loans accounted for 40 percent of purchase loans, 25 percent of renovation mortgages, and 49 percent of refinance approvals. If we view the national urban system from the perspectives of these communities, it is anchored in Texas, led by El Paso and San Antonio (both with about 20 thousand affected), followed by McAllen, Laredo, Brownsville, Houston, and Corpus Christi. These Texas cities account for 85 percent of the applicants in this cluster of neighborhoods. Yet small concentrations in communities elsewhere reflect the widely-discussed new regional geography of Hispanic population growth in the United States, with notable populations in northern cities like Philadelphia, Pittsburgh, and Reading, Pennsylvania, New York, Camden, New Jersey, Springfield, Massachusetts, and Gary, Indiana.

Finally, consider the predatory penetration of white working-class neighborhoods. Cluster 43 identifies some 525 distinctive tracts across the South, comprising about 166 thousand loan applicants. On average, two-thirds of all applicants in each of these neighborhoods are non-Hispanic White, and a quarter of all applications are collateralized by mobile homes. Subprime penetration is greatest in the home purchase market (37 percent), but these areas also face persistent exclusion (overall conventional denials exceed 35 percent). Viewed from the perspective of these communities, the urban hierarchy of subprime credit is led by Houston, followed by Jacksonville, Florida, Fayetteville, North Carolina, Tampa-St. Pete, Charleston, South Carolina, Tulsa, Oklahoma, and Birmingham, Alabama. The appearance of a prominent part of the African-American subprime urban system on this list is instructive: central Birmingham has several Black communities marred by rate-spread lending, but at the centroid of Cluster 43 -- in mathematical terms, the most representative of this group of 525 neighborhoods -- is an expansive tract in Jemison, Alabama, along the Interstate 65 corridor between Birmingham and Montgomery. This is a working-class White part of exurbia gradually being invaded by lower middle-class refugee commuters priced out of the more expensive subdivisions closer to Birmingham. As the *Birmingham News* put it when describing the local implications of a national study on housing and commuting costs, "new subdivisions from Hayden to Jemison and from Vance to Lincoln draw Birmingham workers" in search of more affordable homes (Taylor, 2006). One couple told the reporter that each was spending twenty hours per week behind the wheel commuting from their new home; the husband worked at U.S. Steel, and seemed to have a visceral understanding of bid-rent curves: "We wanted a new house, but we didn't want the $150,000 .... We looked at several other houses, and we thought this was pretty far out." (quoted in Taylor, 2006). His wife noted that "No matter where we went, we knew were going to have to drive" -- so much so that the costs of caring and feeding for their automobiles exceeded the mortgage payments (Taylor, 2006). Alonso's

(1964) indifference curves are marching ever farther outward amidst new subdivisions and old trailer parks on the Southern urban fringe, but the subprime lenders are not far behind. More than a third of all mortgage applicants were denied here in 2004. More than two-thirds of all applicants are non-Hispanic White, and 26 percent were backed by mobile homes. More than half of all home purchase originations here exceeded the rate-spread trigger.

Legislation and Mobilization: Mapping the State of Play

Exploring the local, neighborhood imprint of subprime and predatory lending can only take us so far. We must also consider legal developments at the scale of the states. From an organizer's perspective, the evolving constitutional and regulatory dimensions of the American federal system force a choice: between long-term organizing to combat predatory lending with comprehensive national, federal legislation, and more immediate, urgent efforts to pass bills at the state level to deal with the worst problems happening right now. Choosing one of these paths does not always and inevitably undermine the prospects for the other, but there are certain inescapable tradeoffs between short-run tactical moves and long-term strategic investment, and between the scope and strength of coverage. The community reinvestment movement has been confronted with a powerful credit and banking lobby in Washington that has stymied nearly all meaningful reform efforts over the last decade, however, and many organizers saw little choice but to concentrate their efforts at the state and local levels.

Advocates have found receptive audiences in a growing number of state legislatures. North Carolina's 1999 legislation marked the first law designed to reduce predatory lending practices, and it quickly inspired legislative and regulatory struggles in other states. The noted civil rights litigator John Relman observes that state legislative actions

"reflect both frustration and dissatisfaction with the current federal and state enforcement schemes," and "have thrust state legislatures back into their traditional role as local laboratories for the development of new, experimental remedies and causes of action." (Relman at el., 2004, p. 168). More than two dozen states have passed some kind of legislation to combat predatory home lending (Li and Ernst, 2006), and the result has created a complex topography etched by quite different operational definitions of "predatory" or "high-cost" loans, varied restrictions on permissible underwriting practices and terms of credit, and diverse configurations of enforcement and penalties for violations. The increasing complexity of the post-North Carolina legislative landscape has prompted considerable anxiety for the larger mortgage industry players. One of the industry's prominent lobbyists compiles a monthly worksheet tracking every relevant detail of the status, content, sponsorship, and ultimate disposition of every single predatory lending bill introduced in any state legislature nationwide; the most recent summary "scorecard" in our possession[6] lists fifty-two distinct bills that were pending in twenty state legislatures as of late January, 2004 (Butera & Andrews, 2004a, 2004b).

Until recently, it has been virtually impossible to map this complex legal and regulatory landscape -- a confusing patchwork that "subjects a lender with offices around the country to a Byzantine and inconsistent set of requirements in different states and localities" (Relman et al., 2004, p. 155). Yet several recent advances now make it possible to see what the years of organizing, research, and policy development have

[6] For a few years, Butera & Andrews distributed these worksheets -- along with a rich stream of almost daily news clippings, bill drafts, and other materials -- to anyone who signed up on the firm's "interested parties" list. Access was restricted in early 2004, however, presumably because the firm discovered that the audience had expanded beyond clients and industry supporters to include a more critical cadre of anti-predatory lending researchers and activists. Butera & Andrews still distributes some materials on its public website, however, including an updated roster of laws that have taken effect in 28 states and a number of counties and cities (Butera & Andrews, 2007).

produced. As part of research designed to measure how state laws affect borrowers' choices between conventional and FHA-insured credit, Ambrose and Pennington-Cross (2000) developed a taxonomy of state laws on foreclosure and the permissibility of deficiency judgments (see also Pence, 2003). States with the greatest protection for delinquent borrowers mandate a judicial foreclosure process and bar lenders from deficiency judgments (i.e., taking a debtor's non-housing assets to satisfy foreclosure losses); the most creditor-friendly state laws allow lenders to pursue expedited non-judicial foreclosures and to receive deficiency judgments. Two additional, intermediate groups of states have only one of the judicial and deficiency judgment provisions, but not both.

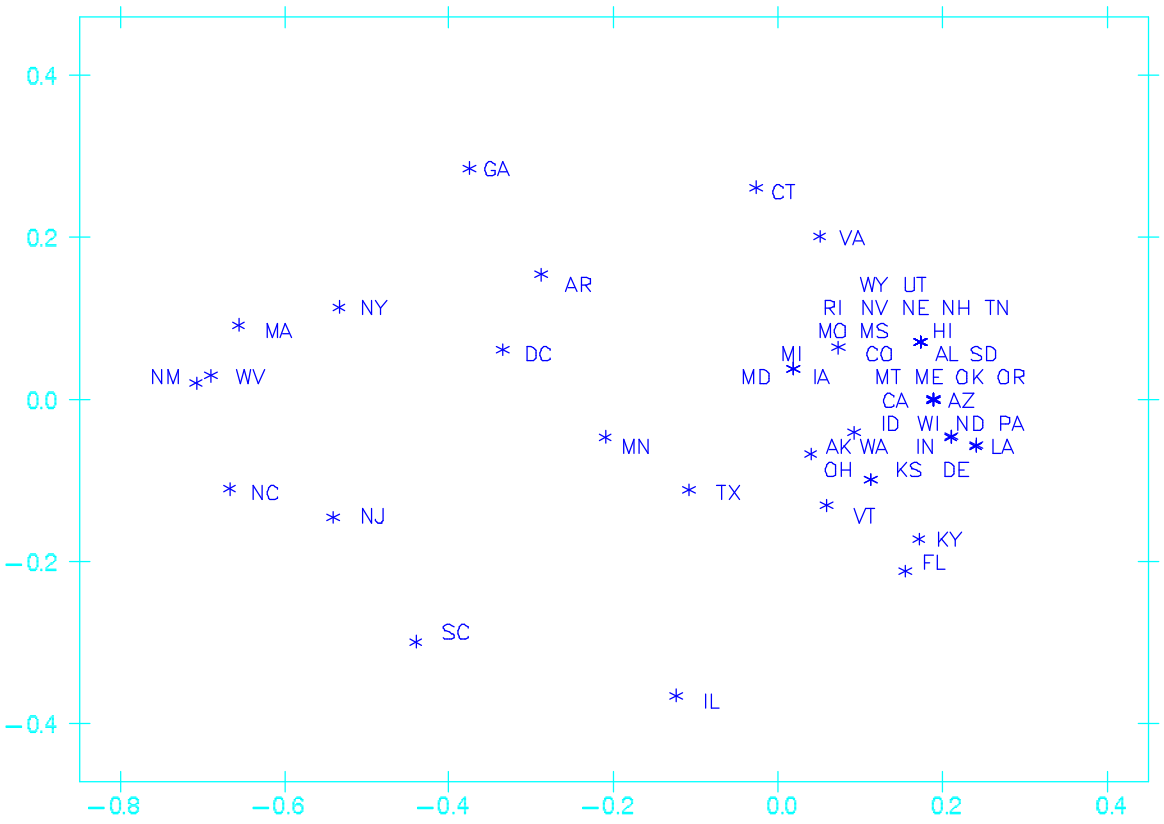
Even more important for our purposes, however, is the work of Li and Ernst (2006). Li and Ernst (2006) undertook a detailed examination of how a "typical" subprime loan will be regulated (if at all) under the many state laws that took effect between 2000 and 2005. They define a typical subprime loan as an owner-occupied first-lien conventional refinance with a cash-out option, made by a non-depository lender for an amount at the statewide median for subprime loans granted in the year when the respective state law took effect. Their analysis also classifies state laws according to their interactions with various provisions of federal law, and captures specific loan features and underwriting practices that have transformed so many parts of low-income homeownership over the last decade. For each specific term and practice, Li and Ernst (2006) code states to a three-level ordinal scheme: 1 denotes states where the only protection, such as it is, relies on the weak and easily-skirted federal Home Ownership Equity Protection Act (HOEPA); 2 denotes some additional regulation mandated by state law; and 3 represents a distinct, higher level of borrower protection. These ordinal variables are defined to measure the net results of tradeoffs and compromises in different states' regulation of many separate facets of the mortgage-lending transaction: maximum

allowable points and fees, the inclusion of yield spread premiums in the calculation of fees, the duration and amount of prepayment penalties, the quick repetition of transactions with the same borrower (loan flipping), pre-loan counseling provisions and fee limits for high-cost products, legal remedies for lender violations, and overall coverage (e.g., whether the law covers open-ended home equity loans). Taken together, the information compiled by Ambrose and Pennington-Cross (2000), Li and Ernst (2006), and Pence (2003) allow us to distill the extraordinary complexity of state legal and regulatory regimes into seven clear and consistent measures of the degree of protection against predatory abuses. This was never before possible.

We constructed a matrix comparing each of the fifty states and the District of Columbia according to these regulatory measures. We calculated the inverse of Gower's similarity coefficient, a metric specifically designed to correlate variables coded on nominal and/or ordinal scales so that numerical operations requiring a positive semi-definite correlation matrix can be used in subsequent analytical procedures (Gower, 1971, p. 865). Taking the Gower inverse creates a lower-triangular distance matrix: each cell denotes the distance separating two states in the politically and legally constructed space of regulation in the mortgage market. We then use a close relative of cluster analysis to visualize and map this newly-created space (Kruskal and Wish, 1978). Multidimensional scaling was always an implicit possibility within the Euclidian spaces constructed by cluster analysis, but in the 1960s and 1970s the formalized development of the necessary algorithms (Kruskal, 1964) finally allowed us to tell the computer how to create the same sort of cognitive spatial representations that always seem so prominent in the geographical imagination. As Gould quipped, "space is not a wastepaper basket that sits there waiting for us to fill it with things, but something we define to suit our needs." (Gould, 1986, p. 202).

In this case, we need to map the spaces created by years of hard work and organizing by many different professionals in the Community Reinvestment movement; creating such a map involves an iterative series of matrix-algebraic operations to create a two-dimensional, simplified representation (something like a conventional map) distilled from the distances separating the states in the seven-dimensional space of mortgage market regulation. As with all map projections, the operation involves some degree of unavoidable distortion; but in this case, the un-transformed, raw data converge quite quickly, yielding a quite robust badness-of-fit criterion of only 0.117, and an encouragingly tight correlation (0.98) between the mathematically calculated and mapped distances between all possible 1,275 state-pairs. If we adopt a generous threshold of 0.20 as a problematic residual, only eleven state pairs cannot accurately be captured in a two-dimensional map. Just as Greenland appears distorted in a Mercator map projection, so Connecticut seems distorted when its lending legislation is compared with that of Virginia, Arkansas, Michigan, Maryland, Iowa, and Missouri.[7] In all of these cases, Connecticut is actually farther away from these states in regulation space than it is possible to show on the two dimensional map: envision Connecticut springing out of the page (like Joe Lieberman?) along a third dimension, to reflect its distinctive regime of moderate coverage of points and fees, its requirement for judicial foreclosure, and its provisions for a private cause of action for violations, with damages equivalent to those available under HOEPA. Beyond this, however, Connecticut provides few borrower protections; by contrast, Virginia (close by and similar in some respects) has no restrictions on points and fees, but does regulate flipping, and does have some high-cost protections; but Virginia state law permits lenders to pursue non-

[7] Of the eleven significant residuals, Connecticut is involved in six, while Minnesota appears in three and Illinois in two.



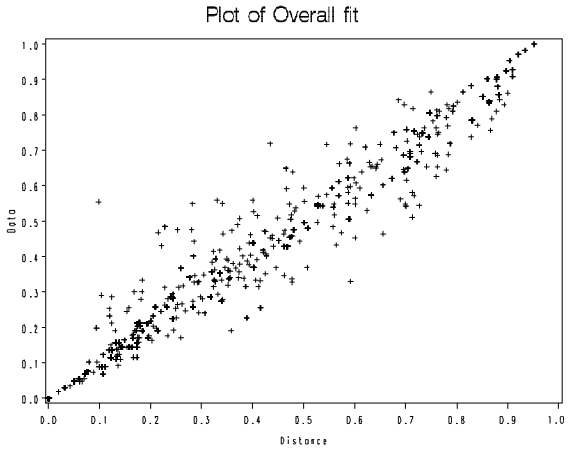


Figure 3. The Legal Space of State Anti-Predatory Lending Laws and Foreclosure Regulations.

States with similar regulatory regimes are shown close together on the "map" represented in the panel above; borrower protections are greater on the west side (left) of this map. This map is, however, a two-dimensional representation derived from a matrix of similarities between states measured on several regulatory variables (loan flipping, prepayment penalties, points and fees, foreclosure rules, etc.). Simplifying this matrix in two dimensions does introduce some error or 'stress' in the fabric of the map. The panel in the lower right shows residuals between the raw data and the distances between pairs of states as shown in the map above; all points would cluster on the diagonal if the model fit the data perfectly. In our analysis, the largest residuals separate Virginia (from Connecticut and Georgia) and Connecticut (from not only Virginia, but also Arkansas, Michigan, Maryland, and Iowa). *Data Sources*: Li and Ernst (2006), Ambrose and Pennington-Cross (2000), Pence (2003).

judicial foreclosure along with deficiency judgments. These combinations of different terms and regulations, in relation to the configuration of all the different regulations among all the other states, are very hard to summarize in a two-dimensional space. But for the vast majority of state comparisons the map is quite accurate, with few distortions. Eleven states in the east-north-central section of this transformed map had, as of 2004, absolutely no additional state protection beyond the weak Federal regulations on high-cost lending: Alabama, Mississippi, Colorado, Nebraska, Nevada, Wyoming, Utah, Tennessee, New Hampshire, Rhode Island, and Hawaii; these states also allow lenders to use non-judicial foreclosures with deficiency judgments. As we move farther from this cluster of unregulated state spaces, borrowers receive greater protections against various types of predatory practices.[8] But recall that state legislatures must engage in a variety of trade-offs and compromises, yielding many different kinds of interventions in the mortgage transaction. As of 2004, Illinois intervened in loan flipping, requiring lenders to consider the net benefit of a loan for certain refinance loans that otherwise fall below high-cost thresholds, and also has high-cost loan protections such as counseling requirements. By contrast, Georgia's regulations focus on restricting points, fees, and prepayment penalties. The central area of the map includes states with strong protections against flipping, but with moderate or weak provisions for other terms. And finally, a group of states on the western fringe of the map have passed legislation that regulates most or all of the terms identified by Li and Ernst (2006) -- North Carolina, Massachusetts, West Virginia, and New Mexico. New Mexico stands out as the gold standard as of 2004, thanks to SB 0449, the Home Loan Protection Act, passed in April, 2003. New Mexico's regulations cap points and fees to two percent of the total loan amount, prohibit flipping "when the new loan does not have reasonable, tangible net benefit to the borrower considering all of the

[8] Note, however, that our portrayal of state regulatory space makes the rather problematic assumption that all regulations are enforced by supervisory agencies with sufficient staff and budget resources.

circumstances," restricts balloon provisions, bans negative amortization, asset-based lending, prepayment penalties, credit-life insurance sales, and penalty interest rates, and mandates counseling for high-cost loans. And the legislation also permits assignee liability, a controversial issue that has led bond-rating agencies to refuse to grade securities backed by loans made in certain states; New Mexico's law caps damages in an attempt to provide greater certainty for investors. In sum, New Mexico's regulatory environment in 2004 represented the culmination of more than a decade of research, organizing, and strategic mobilization -- the best achievement of the Community Reinvestment Movement so far. Has all of this work changed the experiences of homeowners and home buyers? If so, how?

Modeling Subprime Segmentation

This is what is known from the work of Li and Ernst (2006), who negotiated access to a proprietary subprime industry database of loans made between 1998 and 2004. Their analyses indicate that the proportion of loans carrying abusive terms was 38 percent lower in New Mexico compared with states that had no meaningful legislative reform; they also found no significant difference in loan volume compared with unregulated state, and they found no evidence to confirm fears that the market would respond to restrictions on points and fees by charging higher interest rates. Our analysis evaluates questions that are complementary to, but distinct from, Li and Ernst's (2006) analysis of the proprietary industry dataset. Specifically: has the achievement of legislative victories like that in New Mexico altered the national landscape of subprime lending for all institutions covered under HMDA? Have these regulations altered the chance that a borrower will be slotted into the high-cost subprime market?

These are crucial questions. One skeptical reading of all the classifications presented thus far -- the prevalence of subprime lending in McAllen, Texas, the array of Black-Belt cities from the Carolina piedmont to the Mississippi Delta, the neighborhoods in Detroit and East Baton Rouge -- is that we have only mapped the underlying variations in creditworthiness of homeowners and home buyers. This is the conservative and industry mantra: the subprime sector provides credit to those unworthy of prime, A-rated loans, the argument goes, and the credit's higher price is justified by the greater risks of the borrowers. Unregulated competition, the argument continues, will ensure that risk-based prices are driven down as far as possible while still encouraging lenders to remain in business. This conservative perspective has been thoroughly discredited (see Engel and McCoy, 2002, 2004; Howell, 2006; Immergluck, 2004; Squires, 2004). Yet it remains pervasive and influential, and challenges us to refine our classification of the urban system of subprime mortgage capital to account for the characteristics of borrowers.

We calibrated a suite of models predicting the likelihood that an approved borrower receives a rate-spread loan, as a function of applicant financial characteristics, lender type, and racial/gender divisions. We also include an instrumental variable for a key factor cited as justification for slotting certain individuals into the subprime sector: credit history. For certain types of lenders, underwriters who deny an application are required to report the reasons for their decision.[9] Credit history is the single most common reason cited, and many years ago these denial codes inspired Abariotes et al. (1993) to devise an instrumental variable that would identify the distinctive profile of

[9] Denial code reporting is mandatory for lending institutions regulated by the Office of the Comptroller of the Currency, the Office of Thrift Supervision, and the National Credit Union Administration; the codes are optional for lenders supervised by the Federal Reserve Board, the Federal Deposit Insurance Corporation, and the U.S. Department of Housing and Urban Development (see OCC, 2004, p. 4). Lenders can report up to three reasons from a list of nine alternatives, including an expansive, residual "other" category.

applicants likely to raise red flags for underwriters (see also Holloway, 1998; Holloway and Wyly, 2001; Myers and Chan, 1995). The approach involves estimating a logistic regression model predicting the likelihood of an application being rejected specifically for reasons of bad credit, as a function of the necessarily limited financial information in the HMDA files. Estimating this bad credit denial model on a random sample of all applications (including approvals) helps to avoid problems of circularity when the instrument is subsequently used as a credit proxy in an accept/reject model; here, we use the random sample simply for computational convenience in the lengthy maximum-likelihood estimation.[10] Our bad-credit model includes income and loan amount, as well as loan purpose and other plausible correlates of differences in applicant credit, and we also include gender and race/ethnicity. Gender and race/ethnicity are certainly not permissible underwriting criteria like income and loan amount. But including them in this model helps to give the benefit of the doubt to underwriters and lenders: if women and/or racial/ethnic minorities have weaker credit profiles even after accounting for income, including variables for different identities will help to capture those weaker credit histories and create a bias against finding evidence of racial discrimination. The credit instrument, that is, will err on the side of treating gender and racial/ethnic inequalities as legitimate, credit-related underwriting considerations, ensuring that any findings of remaining disparities will be conservative under-estimates of the true degree of bias.

[10] Altering the sample size has negligible effects on the parameters of the model.

Table 5. Logistic Regression Model of Bad-Credit Denials.

Variable	Parameter Estimate		Odds Ratio[a]
Intercept	-3.501	***	
Applicant income	-0.00000643	***	0.53
Income to loan ratio	0.1828	***	1.77
Loan ratio squared	-0.00007		0.95
Owner-occupied	0.3193	***	1.38
Subordinate lien	0.3587	***	1.43
No lien	1.2814	***	3.60
Pre-approval requested	-0.8372	***	0.43
OTS regulated lender[b]	-0.0331		0.97
NCUA regulated lender	-1.4243	***	0.24
Home improvement	1.6149	***	5.03
Refinance	0.8124	***	2.25
Loan ratio * improvement	-0.1254	***	0.88
Loan ratio * refinance	-0.0724	***	0.93
Loan ratio * owner occupied	-0.0252	**	0.98
Demographic information missing	0.4055	***	1.50
Female primary applicant	0.1141	***	1.12
Hispanic	0.8116	***	2.25
Native American	0.722	***	2.06
Asian	0.0131		1.01
Black	1.1351	***	3.11
Number of observations	123,370		
Nagelkerke max R-squared	0.1551		
Percent concordant	75.2		

[a] For continuous variables, odds ratios are reported as the effect of a one-standard deviation increase in the predictor.

[b] Reference categories are: for regulator, OCC; for loan purpose, purchase; for demographic category, Non-Hispanic White males.

*Parameter significant at P<0.05; **P<0.01; ***P<0.001.

Our model indicates that bad-credit denials are more likely for lower-income applicants, but after controlling for income, higher income to loan ratios are more likely to be turned down for reasons of credit (Table 5). Lower-income borrowers applying for relatively small loans, that is, appear to present the worst credit risks to underwriters. All else constant, bad-credit denials are much more likely for refinance

and home improvement applications. Female primary applicants are slightly more likely to be rejected for bad credit, but African Americans are more than three times as likely to be denied, even after controlling for income and all other factors in the model. Latinos and Native Americans are more than twice as likely as Anglo Whites to encounter bad-credit rejections.

We used the parameters from the bad-credit model to calculate a continuous probability estimate for every applicant in the dataset. This measure represents each individual applicant's statistical similarity to those borrowers eventually rejected by underwriters who specifically cite credit history as a justification. This approach allows us to assess the effect of borrower risk factors when we estimate a broader model of the division between prime and subprime loans among borrowers who are approved for loans (Table 6).[11] Without controlling for credit (Model 1), key determinants of whether a borrower will get a rate-spread loan include loan purpose, and whether the mortgage is a first or second lien; increasing applicant income by one standard deviation reduces subprime likelihood by a factor of 0.41. Controlling for credit history (Model 2), however, suggests that most of the differences between purchase, renovation, and refinance applicants stem from lenders' assessments of borrower credit risk: comparing those of similar credit quality, renovation and refinance loans are actually less likely to be subprime.

Controlling for demand-side factors such as applicant income and credit risk allows us to provide a rigorous focus on the dynamics of capital in driving subprime segmentation (Table 6, Model 3). Three findings stand out. First, note that racial/ethnic and gender disparities cannot be explained solely in terms of borrower deficiencies.

[11] Once again, we estimated this model on a random sample of all approved applications, with the smaller number of observations mitigating the inflation of spurious signifance tests for parameters.

Female primary applicants are, all else constant, 1.32 times more likely to end up with subprime credit. Racial/ethnic inequalities are even more pronounced. African

Table 6. Model of Subprime Mortgage Segmentation, 2004.

Parameter	Parameter Estimate	Odds Ratio[a]	Parameter Estimate	Odds Ratio[a]	Parameter Estimate	Odds Ratio[a]
Intercept	-0.8637 ***		-1.8247 ***		-4.0743 ***	
Applicant income	-0.00000965 ***	0.411	-0.00000501 ***	0.630	-0.00000852 ***	0.457
Income squared	0.00000000000501 ***	1.622	0.00000000000279 ***	1.309	0.00000000000437 ***	1.524
Income to loan ratio	0.1477 ***	1.357	0.1453 ***	1.350	0.1837 ***	1.462
Loan ratio squared	-0.00487 **	0.651	-0.00265 *	0.791	-0.00317 *	0.756
Owner-occupied	-0.3391 ***	0.712	-0.4549 ***	0.635	-0.2892 **	0.749
Subordinate lien	0.9395 ***	2.559	0.4765 ***	1.610	0.502 ***	1.652
Pre-approval requested	-0.3027 *	0.739	0.1489	1.161	-0.3586 *	0.699
OCC-regulated lender	-1.6043 ***	0.201	-1.6057 ***	0.201	-1.787 ***	0.167
OTS-regulated lender	-1.7107 ***	0.181	-1.7106 ***	0.181	-2.1983 ***	0.111
FDIC-regulated lender	-0.6514 ***	0.521	-0.6047 ***	0.546	-1.1414 ***	0.319
NCUA-regulated lender	-1.8569 ***	0.156	-0.9454 ***	0.389	-2.4496 ***	0.086
HUD-regulated lender	0.6679 ***	1.950	0.6184 ***	1.856	0.1767 *	1.193
Home improvement	-0.1541	0.857	-1.1074 ***	0.330	-0.1827	0.833
Refinance	0.1328 *	1.142	-0.4527 ***	0.636	-0.00716	0.993
Credit history instrument			20.3851 ***	3.699	5.2483	1.400
Credit instrument squared			-42.8336 ***	0.299	-21.4294 ***	0.547
Demographic information missing					0.285 ***	1.330
Female primary applicant					0.2759 ***	1.318
Hispanic					0.3805 **	1.463
Native American					0.1567	1.170
Asian					-0.5719 ***	0.564
Black					1.0607 ***	2.889
Loan not sold in same year as origination					3.3116 ***	27.429
Loan sold through private securitization					2.8268 ***	16.892
Loan sold to bank or savings institution					2.7575 ***	15.760
Loan sold to life insurance company or finance company					2.5683 ***	13.044
Loan sold to affiliate institution					2.8811 ***	17.834
Loan sold to other purchaser					3.1341 ***	22.967
Distance from New Mexico in state regulatory space					1.2509 **	1.394
Distance squared					-1.0328 **	0.729
Number of observations	14,390		14,390		14,390	
Nagelkerke max R-squared	0.2133		0.2409		0.3276	
Percent concordant	77.4		78.8		83.2	

[a] For continuous variables, odds ratios are reported as the effect of a one-standard deviation increase in the predictor.

[b] Reference categories are: for regulator, FRB-regulated; for loan purpose, purchase; for demographic information, non-Hispanic White male primary applicants; for loan sales, to Fannie Mae, Freddie Mac, Ginnie Mae, or Farmer Mac.

*Parameter significant at P<0.05; **P<0.01; ***P<0.001.

Americans are almost three times more likely to wind up with subprime credit compared with otherwise identical non-Latino Whites. Given that racial/ethnic

differences in credit are already included in the credit instrument, the disparities reported here must be regarded as conservative underestimates. Second, securitization networks differ sharply between the prime and subprime segments. Thanks to a series of policy reforms at the giant Government Sponsored Enterprises, Fannie Mae and Freddie Mac avoid direct purchases of subprime originations (although they do hold some subprime positions through bond pools). Originators who sell their loans into the secondary market in the same year sell prime notes to the GSEs, while subprime paper is either held in portfolio or sold to other types of purchasers.

Our third and final finding concerns the new space created by years of work in the Community Reinvestment Movement. We calculated the statistical distance between each state and New Mexico, measured in the seven-dimensional space of the varied predatory loan regulations. Adding this variable to the loan segmentation models provides a unique, direct way of assessing the legal and regulatory frontier: do borrowers in state legal environments that are far away from the achievements of New Mexico face any different likelihood of winding up with subprime credit? Our analysis suggests that the answer is unequivocally yes. The distance measure is positive and statistically significant. All else constant, going 'away' from New Mexico in state regulatory space by one standard deviation -- in the units of the map of Figure 3, going from New Mexico to a bit beyond New Jersey -- increases the odds of segmentation by a factor of 1.4. This effect is robust to other model specifications: the distance measure is positive and significant when the model is estimated without the credit instrument and secondary market variables, and also in models excluding gender and race/ethnicity.

But the effect is clearly non-linear. Borrowers in states close to New Mexico's progressive regulatory climate have lower chances of winding up with a subprime loan;

but the gap is not as large as one would expect when compared with those states where there is no meaningful protection beyond the Federal HOEPA rules. We can visualize the nonlinear effect if we plot the conditional probability of segmentation for the same

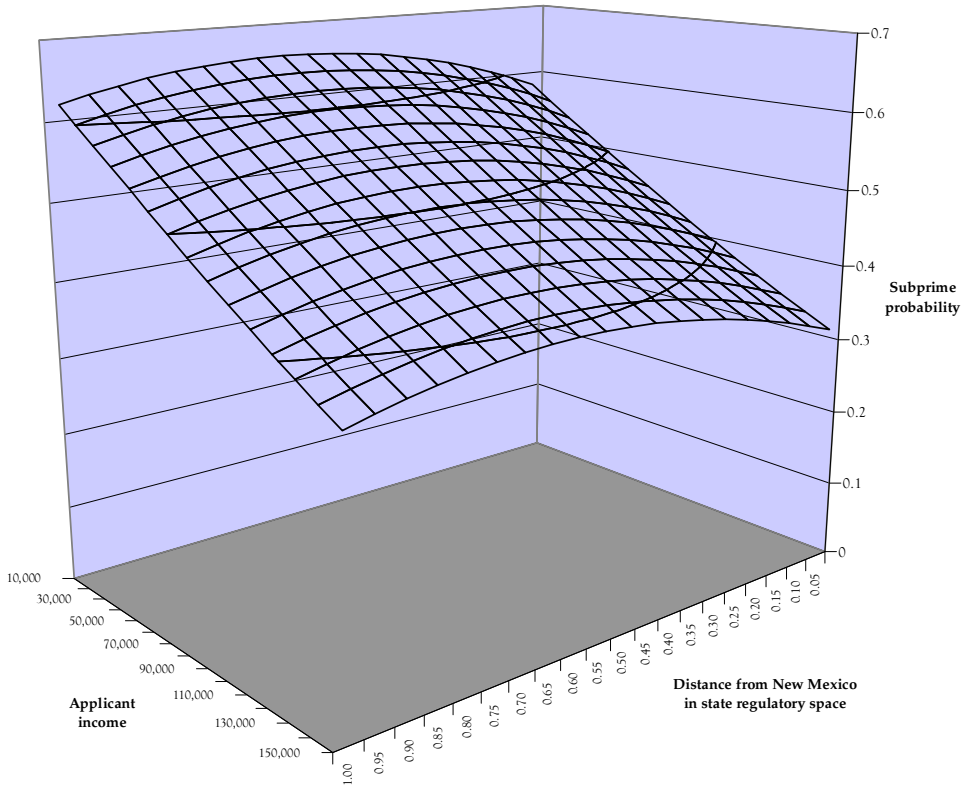


Figure 4. Conditional Probability Plot of Subprime Loan Segmentation.

type of borrower[12] at different income levels and in states at varying distances in regulatory space (Figure 4). The effect of regulatory space is rather modest, but this finding should be understood as the most conservative estimate possible, given the inclusion of the credit instrument with other factors in the model. The greatest effects appear in the middle range. States that appear in the midsection of the map in Figure 3,

[12] To create the conditional plot, we calculated segmentation probabilities for an African American woman with an average credit profile, seeking an owner-occupied loan at an average debt burden from an independent mortgage company that sold the loan to an "other purchaser" in the same calendar year.

such as Georgia, Arkansas, Washington, DC, Minnesota, Texas, Illinois, and almost all the way over to Ohio, Missouri, Michigan, Iowa, Alaska, and Vermont. In this middle ground, after controlling for all other factors in the model, a borrower is between seven and eight percentage points more likely to end up in the subprime market compared with an otherwise identical borrower in the most comprehensive regulatory environment. This finding suggests that the net effects of subprime market dynamics and legislative reforms are most turbulent in the battlegrounds where states have imposed only a few specific limitations on certain types of market behaviors (thus permitting predators to pursue innovative exploitation strategies through the loopholes). For more distant, less regulated states, subprime and predatory market penetration are certainly major problems. But when we control for a measure of creditworthiness that may itself mask a certain amount of discriminatory steering, much of the prevalence of subprime lending in these states can be explained in terms of applicant characteristics.

These results offer robust evidence that complements other empirical studies of racialized and gendered market segmentation (Calem et al., 2004; Immergluck, 2004) and of the success of state-level reforms in reducing predatory practices while not shutting off legitimate market activity (Quercia et al., 2004; Li and Ernst, 2006). But our use of a measure that collapses the multiple dimensions of state regulation into a single variable certainly does gloss over important contingencies in various state-level battles over permissible market practices. It is also important to recognize that many of the relations included in our segmentation model (debt burden, credit history, etc.) have different effects by gender and race/ethnicity.[13] Each of these issues merits further

[13] To test whether the state regulatory distance variable has disparate effects, we re-estimated the segmentation model with interaction terms for all demographic identifiers. Results indicate that the

investigation. But the evidence thus far confirms that the culmination of more than a decade of research and policy advocacy at the state level has led to measurable shifts in the geography of subprime segmentation.

Conclusions

Not long ago, changes to Federal financial institution disclosure rules provided new, loan-level information on high-cost subprime mortgages. In this paper, we explored the first full year of loan records made available under the new rules, as a way of mapping the penetration of subprime mortgage capital into various parts of the American urban system. Some of our analysis has been methodologically illustrative, demonstrating the value of classification techniques for identifying distinctive credit environments in certain types of cities and suburbs. Subprime market penetration clearly distinguishes metropolitan areas that embody the interplay between today's exploitative inclusion and earlier eras of racialized exclusion, illustrated most clearly in a broad swathe of metropolitan areas in a Black Belt of financial exploitation, from the Carolina piedmont to the Mississippi Delta. But part of our narrative has followed a more traditional analytical path, testing the hypothesis that the topography of subprime lending across different metropolitan areas is more than just a reflection of the geography of high-risk, poor-credit borrowers. Even after accounting for income, loan amount, and an estimate of credit risk that may itself incorporate racial discrimination, we still find that African Americans are almost three times more likely than Anglo Whites to end up with subprime credit. But part of our analysis has also sought to revive an old, often-overlooked way of mapping the spaces created by human struggles in the dynamic environment of regulations and markets in American housing policy. Fusing

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effects of regulatory distance are significantly greater for female primary applicants, and significantly reduced for Hispanic borrowers.

multidimensional scaling techniques with logit regression, we find compelling evidence that the state-level reforms pursued by the Community Reinvestment Movement over the past decade have significantly altered the spatiality of subprime credit segmentation. Still, our multidimensional scaling analysis captures the state of struggle at a single point in time -- 2004 -- and there is little doubt that subsequent developments have etched new geographies, some of them quite controversial. Illinois, a state in the contested middle ground with a few targeted regulations in 2004, passed legislation the next year requiring counseling for borrowers with low credit scores seeking high-cost loans in certain parts of Chicago's South Side, prompting not only an industry backlash but also a few charges of racism from civil rights and community organizations. Moreover, the dynamic patchwork of state and local regulations presents difficult long-term strategic choices: if indeed the industry partisans are correct in their assertions that tight rules will encourage lenders to withdraw and shut off legitimate credit to some states, how should advocates divide resources between achievable state-level reforms and more difficult campaigns at the federal level? The Senate Banking Committee is set to convene hearings on predatory lending under the new Democratic leadership in Congress, but the politics of federalism present serious challenges to meaningful, strong regulation at the national scale.

As we write the first draft of this paper, the financial pages are filled with sordid chronicles of the irrational exuberance of subprime lending. Two weeks after American financial analysts laid blame for a 416-point slide in the Dow on a previous day's slide on the Shanghai exchange, Asian and European stock markets repaid the favor with a hemorrhage "as concerns spread about the consequences of loose lending practices in the American housing market" (Timmons and Werdigier, 2007, p. C1). The Mortgage Bankers Association disclosed that the percentage of homes entering the foreclosure process reached the highest figure in the 37-year history of the statistic, and journalists

began to draw vivid parallels to the collapse of Enron, WorldCom, and other mirages of yesterday's new economy. Perhaps the most colorful illustration was the red convertible Ferrari driven by an executive at the notorious, imploded New Century Financial (Creswell and Bajaj, 2007). The obscure terminology of the subprime sector is now appearing on prime-time exposes of "liar's loans" (loans with no income verification), teaser-rate ARMS (adjustable-rate mortgages that re-set to higher rates after two or three years), hybrid ARMS (suitably dubbed "HARMS"), and at least one creative lender's advertisements for NINJA loans: No Income, No Job, no Assets (Pearlstein, 2007, p. D1). Unfortunately, a market catastrophe produced by the irresponsible behavior of capital has ushered in a new round of conservative attempts to shift the blame to consumers. Despite mounting evidence that the riskiest subprime loans have involved products pushed on consumers, and exotic instruments designed to help higher-income and speculative buyers qualify for larger loans in overheated housing markets, the *Wall Street Journal* took the opportunity to suggest that the spreading insolvency of subprime lenders simply proves that they were charging too little to compensate for the credit risks of their clientele (Wall Street Journal, 2007). Amidst this flood of press coverage of subprime, of what the Economist dubbed "Subterranean Homesick Blues," our analysis might appear somewhat dated. But looking back on the urban system of subprime lending in 2004 offers valuable insights: the first year of enhanced HMDA data coincided with the first years of growth in the now ill-fated subprime boom. In other words, our evidence for 2004 is something of a best-case scenario, and almost certainly yields less damning evidence compared with the industry excesses of 2005 and 2006. In the end, however, the most hopeful result of our analysis is that we find clear and compelling evidence that strategic research, targeted activism, and judicious legislation can be successful in reducing the stratification and exploitation of segmented mortgage markets.

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