



The effect of metropolitan-area mortgage delinquency on health behaviors, access to health services, and self-rated health in the United States, 2003–2010



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ABSTRACT

The recent housing crisis offers the opportunity to understand the effects of unique indicators of macroeconomic conditions on health. We linked data on the proportion of mortgage borrowers per US metropolitan-area who were at least 90 days delinquent on their payments with individual-level outcomes from a representative sample of 1,021,341 adults surveyed through the Behavioral Risk Factor Surveillance System (BRFSS) between 2003 and 2010. We estimated the effects of metropolitan-area mortgage delinquency on individual health behaviors, medical coverage, and health status, as well as whether effects varied by race/ethnicity. Results showed that increases in the metropolitan-area delinquency rate resulted in decreases in heavy alcohol consumption and increases in exercise and health insurance coverage. However, the delinquency rate was also associated with increases in smoking and obesity in some population groups, suggesting the housing crisis may have induced stress-related behavioral change. Overall, the effects of metropolitan-area mortgage delinquency on population health were relatively modest.

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1. Introduction

1.1. Background

Macroeconomic declines have generally been associated with decreases in mortality in high income countries (Catalano et al.,

2011). Changes in health behaviors are among the hypothesized explanations for these “procyclical” fluctuations in mortality (Bezruchka, 2009; Granados, 2005). Reductions in work-related strain from fewer hours or a slower pace of work, for example, might reduce the prevalence of unhealthy behaviors and stress-related illness, including cardiovascular diseases. Increases in the unemployment rate have been associated with a lower prevalence of unhealthy behaviors, including smoking, alcohol consumption, and obesity, (Charles and DeCicca, 2008; Freeman, 1999; Gruber and Frakes, 2006; Ruhm, 2000, 2005; Ruhm and Black, 2002; Xu, 2013), as well as cardiovascular causes of death (Gerdtham and Ruhm, 2006; Ruhm, 2000), although contradictory evidence exists (Dávalos et al., 2011; Dee, 2001; Stuckler et al., 2009).

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Consistent with earlier work, studies of the 2007–9 recessionary period have found countercyclical increases in recreational exercise (Colman and Dave, 2013; Tekin et al., 2013), consumption of 'healthier' foods (Dave and Kelly, 2012), and decreases in alcohol consumption (Nandi et al., 2013), although most studies found largely negligible behavioral impacts (Latif, 2014; Nandi et al., 2013; Tekin et al., 2013).

Much of the previous literature has measured macroeconomic conditions by the unemployment rate or other measures of economic productivity. Comparatively little research has focused on alternative measures of macroeconomic conditions. In contrast to previous recessions, the Great Recession brought about profound impacts on international housing markets. From the mid-1990s to the collapse of the US subprime market in 2007, several advanced economies saw unprecedented booms in real housing prices, with low interest rates, income growth, deregulation, and mortgage market innovations driving demand (André, 2010). With the onset of the financial crisis, many countries concurrently saw downswings in housing markets with sharp reductions in prices and accessible credit, and increases in payment delinquency (mortgage arrears) and housing foreclosure (Andritzky, 2014; European Commission, 2011; Rousová and van den Noord, 2011). In the US, the proportion of housing units receiving a foreclosure filing increased from 0.58% in 2006 to a record 2.23% in 2010 (RealtyTrac Staff, 2011b) and national home prices declined 32% between 2006 and 2009 (Maitland and Blitzer, 2011). The housing crisis was identified as a risk to economic recovery, prompting calls for research into its effects on population health (Bennett et al., 2009).

There is extensive interest in understanding the population health effects of the recent economic crisis. However, although it was a fundamental feature, few studies have considered the role of the housing crisis in shaping individuals' responses to the Great Recession. Specifically, using the example of the housing crisis in the US, we estimated the effects of metropolitan-area mortgage delinquency on health behaviors, access to and use of health services, self-reported health status, and variations in these outcomes by race/ethnicity among a nationally representative sample of adults between 2003 and 2010.

1.2. Conceptual framework

The housing crisis was manifest in increases in mortgage delinquency and foreclosure. Foreclosure is the process by which the lender forces the sale of a property to reimburse their claim. The foreclosure process begins with the failure of the borrower to make a mortgage payment (delinquency, also known as arrears). In the US from 2008 to 09, the proportion of 60-day delinquent homes foreclosed on was approximately 40% (Mian et al., 2011). Mortgage delinquency is more than twice as likely to result in a home foreclosure in states with a non-judicial foreclosure process compared to states where lenders must file a lawsuit to initiate the foreclosure process (Mian et al., 2011). The period between mortgage delinquency and foreclosure also varies substantially across states with an average time between the last payment made and home loss at foreclosure sale of 354 days prior to 2008 (Cutts and Merrill, 2008), and 400 days by 2011 (RealtyTrac Staff, 2011a). Individuals from foreclosed homes are more than twice as likely to migrate as their neighbours although half continue to reside in their homes two years following foreclosure initiation. Of those that migrate, 80% remain within the same metropolitan area (Molloy and Shan, 2012).

Foreclosures in the local-area have the potential to impact health independently of individual-level exposure. A substantial literature has linked local area foreclosures to the depreciation of property values (Immergluck and Smith, 2006a; Lin et al., 2009;

Schuetz et al., 2008). A 20% decline in home price has been estimated to make borrowers, facing negative equity, 15% more likely to default (Bajari et al., 2008). Overall, 20–30% of the total decline in US housing prices between 2007 and 2009 has been attributed to foreclosures (Mian et al., 2011). Declining property values might produce chronic financial stress, which has been associated with mortality (Szanton et al., 2008), as well as poor general (Drentea and Lavrakas, 2000; Kahn and Pearlin, 2006) and mental health (Meltzer et al., 2011). Additionally, overall stress has been linked to insalubrious behaviors including smoking (Colby et al., 1994; Richards et al., 2011), alcohol consumption (Dawson et al., 2005; Keyes et al., 2011), and increased adiposity (Wardle et al., 2011). Financial strain may also lead to income constraints and restrict certain health-compromising or promoting behaviors. A preponderance of foreclosures may further generate negative externalities by limiting the availability of loans (Avery et al., 2011) and residential investment (Mian et al., 2011), reducing local tax revenues (Schuetz et al., 2008) and increasing municipal costs related to securing and repairing vacant homes (Apgar et al., Feb 2005). Prolonged home vacancies due to foreclosures have been associated with increases in violent and property crimes (Baumer et al., 2012; Immergluck and Smith, 2006b; Stucky et al., 2012).

The foreclosure epidemic may also have exacerbated social inequalities in health. Foreclosure activity has been more common in neighborhoods with higher concentrations of racial minorities (Avery et al., 2011; Rugh and Massey, 2010). Blacks and Hispanics were more likely than whites, independent of borrower characteristics, to receive higher priced or subprime loan products (Avery et al., 2007; Bocian et al., 2008; Bradford and Center for Community Change, 2002), which may carry increased risk of foreclosure (Avery et al., 2007; Immergluck and Smith, 2004). Furthermore, home ownership encompasses a greater proportion of mean net worth in black and Hispanic compared with white households, and blacks and Hispanics experienced steeper declines in equity during the foreclosure crisis (23% and 51% respectively) than white households (Taylor et al., 2011).

Few empirical studies have investigated the population health consequences of area-level foreclosures during the recent recession. Descriptive studies showed increased hospitalizations for mental illness during periods of high national foreclosure filings in Nevada (Menzel et al., 2011), spikes in West Nile virus incidence in Bakersfield, CA coinciding with increases in foreclosed homes (Reisen et al., 2008), and lower self-rated health in high foreclosure-abandonment risk census tracts among breast cancer survivors (Schootman et al., 2012). However, the use of pre-post or cross-sectional study designs precludes causal inference from these studies. Currie and Tekin (2011) used fixed-effects regression models and showed positive associations between zip-code foreclosures and non-elective hospital visits for stress-related conditions, as well as admissions related to anxiety and suicide, among those younger than 65. One long-term study constructed individual measures of exposure to nearby (≤ 100 m) foreclosure activity and found associations with weight gain (Arcaya et al., 2013), while another study showed that large increases in zip-code-level foreclosure indicators were associated with onset of depressive symptoms in the elderly (Cagney et al., 2014).

In this study, we used a unique source of data on national credit conditions to measure the health effects of exposure to the US housing crisis and investigated a number of novel outcomes relevant to hypothetical procyclical mechanisms of mortality. Our analysis takes place at the level of the metropolitan statistical area, using a representative sample of adults who participated in the US BRFSS between 2003 and 2010. Our estimates represent population health effects among residents in affected areas, including those in mortgage delinquency, those affected by the externalities of

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