Contagion effects in strategic mortgage defaults

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A B S T R A C T

Using a large sample of U.S. mortgages observed over the 2005–2009 period, we document contagion effects in strategic mortgage defaults. Strategic defaults result from borrowers choosing to exercise their in the money default option and our findings suggest this choice is influenced by the delinquency rate in surrounding zip codes (within a 5 mile radius), after controlling for other known determinants of mortgage default. These controls include a large array of borrower and loan characteristics, local demographic and economic conditions, spatial correlations, and changes in property values. Our findings that the local area delinquency rate is an important factor for strategic defaulters (borrowers that can be influenced in their decision) but not for defaults that are the result of inability to pay (borrowers that had no choice) lend support the contagion hypothesis. Our estimates suggest that a 1% increase in the local area delinquency rate may increase the probability of a strategic default by 7.25–16.5%.

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1. Introduction

The 2007–2010 real estate market collapse and ensuing financial crisis has highlighted the previously little known fact outside of academic and banking circles that US homeowners hold the equivalent of a put option on their mortgages. That is, homeowners have the option to return their property to the lender at any time, which absent other costs becomes valuable if the loan balance exceeds the market value of the underlying property. Exercising this option necessarily results in a mortgage default, but unlike defaults resulting from an inability to pay, these “strategic defaults” occur because homeowners recognized that the benefits of a default outweighed its costs (Das, 2012).

The relative increase in strategic defaults in the last recession has renewed interest among academics and policymakers in the factors that may compel homeowners to default on their mortgages. In a recent paper, Guiso et al. (2013) using survey data find evidence of social contagion: homeowners with negative equity are more likely to strategically default if they know others who have done so. We empirically investigate strategic defaults as identified in Guiso et al. (2013) using a sample of over 30 million mortgages originated over the period 2000–2008 and observed from 2005 to 2009, a period of significant stress in the US housing markets. Specifically, we test the extent to which mortgage default frequencies affect the probability of a strategic default of a nearby mortgage, controlling for other risk factors, including changes in the estimated value of the home.

Peer-effect models are notoriously challenging to identify. In its simplest form, the problem lies in separating the hypothesis that the actions of neighbors influence the actions of individual homeowners from the scenario that such an observation is simply a reflection of common actions of homeowners in the neighborhood. If the hypothesized effect is linear, regressing the outcomes of

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members of a group on the average group outcome would not, in
general, yield identification (Manski, 1993). In theory, however, one
could exploit variations in functional forms or particularities of the
data generating process in order to achieve identification. Indeed, a
variety of papers have pursued these detection strategies by using
panel data (Brock and Darlauf, 2007), by exploiting non-linearities
(Brock and Darlauf, 2001; Sirakaya, 2006), by introducing lags
(Manski, 2000) or variations in group sizes (Lee, 2007).

Our identification strategy is motivated by this literature. The
non-linear aspect we exploit relies on the observation that defaults
occur for one of two reasons: borrowers are unable to service their
debt or borrowers are unwilling to repay because they recognize
that in their situation the benefits of defaulting outweigh their
costs. In the first case, social contagion should be nonexistent
because borrowers do not choose to default. In the second case,
borrowers choose to default and their choice can be the result of
learning from their neighbors’ actions. Specifically, our identifica-
tion strategy is designed to show that (i) the area delinquency rate
does not affect the probability of default in the overall population
of borrowers, but (ii) for borrowers that are most likely to be
strategic defaulters (homeowners with deep negative equity in
their homes yet with high credit scores) the area delinquency
rate statistically and economically increases their probability of
default.

We examine the probability that a given loan in a zip code
enters into default as a function of the 3-month lagged area delin-
quency rate (the 90+ days delinquency rates within a 5 mile radius
of each zip code), while controlling for economic fundamentals
such as borrower and loan characteristics, changes in property val-
ues, economic and demographic conditions at the zip code level,
spatial correlations, as well as time and geographic fixed effects.
We find that for the general population the coefficient on the area
delinquency rate does not affect the probability that a loan will
enter into default. However, for borrowers that are more likely
strategic defaulters we find that a one percent increase in the area
delinquency rate results in a 1.1–2.5% increase in the probability
of default. Moreover, the coefficient on the area delinquency rate
for borrowers in this group is statistically different from borrowers
less at risk of strategically defaulting.

While our results are consistent with a social contagion ef-
fect, they may still be influenced by unobservable, but correlated,
shocks. We fully recognize that, short of an experiment that would
assign homeowners to neighborhoods, correlated effects are hard
to rule out. To the extent that correlated shocks are not fully ab-
sorbed in the controls, our estimates may be upward biased. To
reduce the likelihood that these shocks are driving our results, we
further exploit non-linearities in peer-effects as in Imberman et al.
(2012). If the results are driven by social contagion, the sensitivity
of defaults to nearby defaults should increase with the number of
affected units as the information they provide about the benefits of
strategically defaulting increase. Consistent with this conjecture we
find that the sensitivity of the probability to enter delinquency to
the area delinquency rate monotonically increases in more affected
areas.

In addition to this non-linear test, we perform four other
robustness checks. First, instead of using high credit scores to
identify strategic defaulters, we examine whether Government-
Sponsored Enterprise (GSE) lending classification makes a differ-
ence. This categorization is motivated by Keys et al. (2010) results
showing that GSE borrowers appear to behave differently than non
GSEs borrowers. If, on average, GSE borrowers are more sophisti-
cated than non GSE borrowers, they may be more likely to exploit
the option value of default for strategic reasons. Consistent with
this insight, we find that the area delinquency rate increases the
probability of default for GSE borrowers with negative equity in
their homes, relative to other groups.

Second, following the empirical strategy in Piskorski et al.
(2010), we exploit the increase in the number of strategic default-
ers over time, from a handful in 2005 and 2006 to over 90,000
by 2009. Similar to the non-linearities in peer-effects logic just
discussed (e.g. Imberman et al., 2012), an increase in the number
of strategic defaulters should result in a higher default-area delin-
quency rate sensitivity. Our results are consistent with this obser-
vation. In particular, we re-estimate our main regressions but only
for 2007–2009, and find that the effect of the area delinquency
rate is higher for this sub-period, relative to the entire sample
period.

Our third robustness check utilizes a borrower’s payment his-
tory as another mechanism for identifying strategic defaulters. In
particular, we classify borrowers into two broad groups: those
that never missed a payment in their mortgage (prior to default),
and those that did. We argue that, on average, those that never
missed a payment ought to be, at least relative to those that did
miss some, less likely to be defaulting because of inability to ser-
vice their debt. Consistent with this argument, we find that the
estimated default-area delinquency rate coefficient is highest for
the group of borrowers that never missed a payment in their
mortgage, but had a loan-to-value ratio in their property of over
120%.

The final robustness check is the inclusion of county fixed ef-
ffects interacted with quarter fixed effects in the main model. The
inclusion of these interaction effects aims at absorbing any remain-
ning local (county) and time (quarter) variation not already con-
trolled for in the model. The results are robust to the inclusion of
these interaction effects.

Our findings suggest that there may be important consequences
of mortgage defaults on neighborhoods. For example, Campbell
et al. (2009) and Harding et al. (2009) find that foreclosures reduce
neighborhood home prices. Additionally, Immergluck and Smith
(2006) and Ellen et al. (2012) among others find that foreclosures
increase local crime rates. In contrast, we document that mortgage
defaults incite neighbors to default beyond what can be explained
through lower property prices. Second, this paper fits in the grow-
ing literature examining the effectiveness of debt renegotiation
programs implemented privately or through the government. No-
tably, Mayer et al. (2014) find evidence that homeowners strat-
egically defaulted on their mortgages to take advantage of a court
settlement against CountryWide Financial that offered loan modi-
fication programs to seriously delinquent borrowers. Also, Agarwal
et al. (2013) find that the Home Affordable Modification Program
(HAMP), which provided intermediaries of distressed loans with fi-
nancial incentives to renegotiate mortgages, appears to have had
modest effects in reducing foreclosures and indicates that debt
renegotiation programs that either increased (CountryWide) or
decreased (HAMP) foreclosures on targeted loans are likely to have
sizeable spillover effects on other loans. It further highlights that
social interactions with neighbors are important in shaping home-
owners’ strategic behavior. Third, identifying peer-effects can ed-
cate the mortgage securitization design process. Deep flaws in
the mortgage securitization process such as asset-misrepresentation
by intermediaries (Piskorski et al., 2015) and a bias to foreclose over
similar mortgages held by banks have been reported (Piskorski
et al., 2010). Our results suggest that accounting for amplification
effects through social interactions should be an integral part in
both evaluating the welfare implications of these studies and in
selecting the pool of properties to be securitized.

The question we address in this paper is similar to that of Towe
and Lawley (2013). Examining data in 5 Maryland counties, they
show that, on average, one additional foreclosure in a neighbor-
hood of 12 houses around a reference unit increases the proba-
bility of foreclosure of that unit by 18%. In contrast, this nation-
wide study uses the loan-to-value and credit scores of borrowers

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