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The Determinants of Attitudes toward Strategic Default on Mortgages

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ABSTRACT

We use survey data to measure households' propensity to default on mortgages even if they can afford to pay them (strategic default) when the value of the mortgage exceeds the value of the house. The willingness to default increases in both the absolute and the relative size of the home-equity shortfall. Our evidence suggests that this willingness is affected by both pecuniary and non-pecuniary factors, such as views about fairness and morality. We also find that exposure to other people who strategically defaulted increases the propensity to default strategically because it conveys information about the probability of being sued.

In 2009, for the first time since the Great Depression, millions of American households found themselves with a mortgage that exceeded the value of their home. According to First American CoreLogic, more than 15.2 million U.S. mortgages, or 32.2% of all mortgaged properties, were in a negative equity position as of June 30, 2009, while in some states (such as Arizona and Nevada) this number exceeded 50%.[1] Importantly, the difference between the value of the house and that of the mortgage is often very large. For example, in 2009 the median owner's equity for those who bought a house in the Salinas, CA metropolitan statistical area (MSA) in 2006 was $214,305.[2] Given the magnitude of this phenomenon, it is important to investigate whether homeowners with such a large negative equity value will choose to walk away from their

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[1] http://www.corelogic.com/About-Us/ResearchTrends/Negative-Equity-Report.aspx. A study by Deutsche Bank estimated that 26% of homeowners had negative equity in the first quarter of 2009 and projected this number to be 48% for the first quarter of 2011.

[2] http://www.zillow.com/reports/RealEstateMarketReports.htm.

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houses even if they can afford to pay their mortgages, an action known as strategic default.

Unfortunately, we know very little about the importance and determinants of strategic default on mortgages.[3] In an influential paper, Foote, Gerardi, and Willen (2008) show that, during the 1990 and 1991 recession in Massachusetts, very few people (6.4%) chose to walk away from their houses when their home equity was negative. Yet the 1990s behavior of Massachusetts residents may not be predictive of the national behavior during the 2007 to 2009 recession, since conditions were different and there are important nonlinearities. Hence, in assessing the risk of strategic default, what matters is not the average decline in home prices, but rather the decline in the worst-hit areas.

The main problem in studying strategic defaults is that such defaults are de facto unobservable events. While we do observe defaults, we cannot observe whether a default is strategic as strategic defaulters have incentives to disguise themselves as people who cannot afford to pay and hence they are difficult to identify in the data.

Given this constraint, one way to assess the likelihood of strategic default is to estimate a structural model of default that includes both cash flow considerations and negative equity considerations. One can then use the estimated parameters to simulate a shock to home equity alone and compute the predicted effect. This strategy is followed by Bajari, Chenghuan, and Park (2008), who estimate that ceteris paribus a 20% decline in home prices would lead to a 15% increase in the probability that a borrower would default.

An alternative way to evaluate the likelihood of strategic default is to resort to survey data. In this paper, we study a new quarterly survey of a representative sample of U.S. households. We use the waves from December 2008 (the first) to September 2010 to identify the percentage of current defaults that is strategic and to study the determinants of homeowners' attitudes toward strategic default.

To identify the proportion of strategic defaults, we employ two questions. The first asks, "How many people do you know who have defaulted on their house mortgage?" Those who know at least one such person are then asked, "Of the people you know who have defaulted on their mortgage, how many do you think walked away even if they could afford to pay the monthly mortgage?" By taking a ratio of the two, we obtain an estimate of the percentage of actual defaults that are considered "strategic" by the defaulters' acquaintances. We find that this proportion is large and increasing over time. In March 2009, for instance, 26.4% of defaults appear to be strategic, while in September 2010 that number is 35.1%. As we discuss in the paper, both the level and the trend that we identify are corroborated by subsequent studies using borrower-level data (Experian and Oliver Wyman (2009), Tiruppatur, Chang, and Egan (2010), and Goodman (2009)).

[3] There exists a parallel literature on strategic default for personal loans. While households file for bankruptcy less often than their financial incentives suggest (White (1998)), they are more likely to file when their financial benefit from filing is higher (Fay, Hurst, and White (2002)).

Given the importance of strategic default, we next study the drivers behind homeowners' attitudes toward strategic default. To do so, we ask "If the value of your mortgage exceeded the value of your house by 50K [100K/150K] would you walk away from your house (i.e., default on your mortgage) even if you could afford to pay your monthly mortgage?" By using the answers to this question, we can infer the shape of the function relating the overall cost of defaulting to wealth. The overall cost appears to be increasing in wealth, but at a decreasing rate. Doubling the ratio of home equity shortfall to house value increases the stated willingness to default by 10.4 percentage points when starting from a house value of \$200K to \$400K (Table I, Panel B), but by only 2.7 percentage points if we halve the value of the house.

We further correlate the declared willingness to walk away when the equity shortfall is equal to \$50K/\$100K with various proxies for the typical economic drivers of this decision: the cost of relocation (number of children, number of years in current location), the risk of losing other assets (whether the respondent is in a nonrecourse state), and the stability of the financial position (income and probability of becoming unemployed). We find that the cost of defaulting strategically is driven both by pecuniary and non-pecuniary components, such as views about fairness and morality. Not surprisingly, the biggest determinants are the value of the equity shortfall as a percentage of the house's value and whether the house was bought more than 5 years ago—a measure of the degree of attachment to (and thus the cost of leaving) the current location. Ceteris paribus, a one standard deviation increase in the relative size of this hypothetical equity shortfall increases the probability of strategic default by 25%, but a person who bought his house more than 5 years ago is 28% less likely to default.

We also find that ceteris paribus blacks, Hispanics, and older people are more willing to strategically default, while women are less likely. The fear of becoming unemployed also plays a role. If a person becomes unemployed, it is likely they will be forced to default in the future. Anticipating this possibility reduces the benefit of not defaulting strategically today. A one-standard-deviation increase in the perceived probability of becoming unemployed increases the probability of strategic default by 13% of the sample mean.

Surprisingly, whether a state requires mortgages to be nonrecourse (i.e., the lender cannot go after the homeowner's wealth outside of the house) does not seem to affect the willingness to default strategically. One possible reason is that most people do not know the legal status of mortgages in their state. Another is that most people do not have any assets outside their house and thus the difference between recourse and nonrecourse is moot. To test the first hypothesis, starting with the fifth wave of the survey, we asked people for their subjective estimate of the probability a bank will go after a defaulted borrower. On average this subjective probability is 53.4%, and does not differ between recourse and nonrecourse states.

We next consider moral and social determinants of the attitudes toward strategic default. Eighty-two percent of respondents think it is morally wrong to engage in strategic default. Everything else being equal, people who think

Table I
Descriptive Statistics

Panel A shows summary statistics for the variables used in the paper. Detailed variable definitions are contained in the Internet Appendix. Panel B shows the intensity of strategic default by level of wealth and size of the shortfall of the house value. Panel C shows the number of observations we have for each wave of the survey, using the demographic specification (Table II, Panel B) as a benchmark.

Panel A: Summary Statistics

	Mean	Median	Std. Dev.	Min	Max	Obs
Default at $50K	0.089	0.000	0.284	0.000	1.000	6,079
Default at $100K	0.230	0.000	0.421	0.000	1.000	5,761
Morally wrong to walk away	0.823	1.000	0.382	0.000	1.000	6,190
Angry about the economic situation	3.534	4.000	1.333	1.000	5.000	6,420
Government should impose cap on executive compensation	0.568	1.000	0.495	0.000	1.000	5,353
Government should regulate financial sector more	0.524	1.000	0.499	0.000	1.000	4,630
Trust banks	3.097	3.000	1.197	1.000	5.000	6,414
Know someone who defaulted	0.326	0.000	0.469	0.000	1.000	6,251
Know someone who strategically defaulted	0.141	0.000	0.348	0.000	1.000	6,076
Percentage of foreclosures in the area	0.046	0.025	0.066	0.000	0.662	5,699
Perceived probability that lender would go after defaulters	0.534	0.500	0.345	0.000	1.000	2,724
Time spent reading/watching news during an average day (hours)	1.357	1.000	1.166	0.000	12.000	4,056
Female	0.513	1.000	0.500	0.000	1.000	6,493
Age $\leq$ 35	0.092	0.000	0.290	0.000	1.000	6,275
Age $\geq$ 65	0.319	0.000	0.466	0.000	1.000	6,275
Number of kids	0.507	0.000	0.977	0.000	6.000	6,402
Bought house>5 years	0.775	1.000	0.417	0.000	1.000	5,705
House price expectations (5 years)	3.551	4.000	0.883	1.000	5.000	6,290
Probability become unemployed	0.123	0.000	0.247	0.000	1.000	6,003
$50K shortfall as a fraction of the value of the house	0.366	0.286	0.288	0.006	2.000	5,995
$100K shortfall as a fraction of the value of the house	0.732	0.571	0.577	0.011	4.000	5,995
Value of the house ($)	241,631	175,000	355,852	25,000	8,900,000	5,995

(*Continued*)

Table I—*Continued*

Panel A: Summary Statistics

	Mean	Median	Std. Dev.	Min	Max	Obs
Income ($100K)	0.687	0.563	0.542	0.050	2.500	5,739
Risk aversion	6.160	6.000	2.583	1.000	10.000	6,451
High school	0.937	1.000	0.243	0.000	1.000	6,320
College	0.659	1.000	0.474	0.000	1.000	6,320
Black	0.063	0.000	0.243	0.000	1.000	6,364
Hispanic	0.038	0.000	0.191	0.000	1.000	6,364
Northeast	0.199	0.000	0.399	0.000	1.000	6,493
South	0.361	0.000	0.480	0.000	1.000	6,493
West	0.192	0.000	0.394	0.000	1.000	6,493
Nonrecourse state	0.326	0.000	0.469	0.000	1.000	6,493
Level of equity (Value of the house−mortgage)	188,743	110,000	377,444	–900,000	8,050,000	4,068
Median level of equity in the area (Zillow)	–21,204	–2,736	46,379	–214,305	5,6139	2,805
Feel less morally obligated if:						
Broker sold mortgage	0.386	0.000	0.488	0.000	1.000	202
Bank helped by government	0.279	0.000	0.449	0.000	1.000	219
Bank involved in predatory lending	0.435	0.000	0.497	0.000	1.000	207

Panel B: Fraction defaulting strategically by value of wealth and size of the shortfall

	Shortfall at:			Change in default probability when shortfall increases:		
House value	50K	100K	150K	from 0 to 50	from 50 to 100	from 100 to 150
<100 K	0.144	0.359	0.528	0.144	0.215	0.169
100–200 K	0.113	0.278	0.444	0.113	0.165	0.166
200–400 K	0.086	0.190	0.311	0.086	0.104	0.121
>400 K	0.067	0.168	0.308	0.067	0.101	0.140

Panel C: Number of observations per wave

Wave	Observations
1	434
2	575
3	534
4	533
5	619
6	542
7	494
8	428
Total	4,159

that it is immoral to default strategically are 9.9 percentage points less likely to declare strategic default. Even if the morality question is asked after the willingness to default strategically question, this correlation could be spurious, and may be the result of the respondent's desire to be consistent across responses (i.e., to answer that it is not immoral to default after responding that they will default). Since waves 3 to 8 of the survey randomize the order of the morality and default questions, we use this randomization to correct the estimate for the potential spurious correlation in responses. While smaller, we find that the effect of morality on the probability of default persists even after the correction.

Consistent with the literature on personal bankruptcy (Fay, Hurst, and White (2002) and Gross and Souleles (2002)), the decision to default strategically might be driven by other emotional considerations. People have been shown to be more likely to inflict a loss on others when they have suffered a loss themselves, especially if they consider their loss to be unfair (Fowler, Johnson, and Smirnov (2005)). Accordingly, we regress the willingness to default strategically on measures of anger and trust. We find that people who are angrier about the current economic situation are more willing to express their willingness to default, as are people who trust banks less. Similarly, people who want to regulate executive compensation and the financial sector are more likely to declare a willingness to walk away.

Finally, we find that people who know somebody who defaulted strategically are more likely to declare an intention to do so. This effect is present even if we control for the number of foreclosures in the area and for whether the respondent knows somebody who defaulted non-strategically. This effect could be the result of social contagion, of learning about the cost of defaulting strategically, or a spurious effect of clustering (people with lower moral standards live nearby and know each other). We do not find any evidence for the clustering effect: ceteris paribus, knowing somebody who defaulted does not affect the moral attitude toward defaulting. By contrast, we find evidence consistent with the learning hypothesis: knowing somebody who strategically defaulted reduces the perceived probability that a bank would go after a borrower who defaults.

On average, we find that homeowners' declared willingness to default per given home equity shortfall is roughly constant during the period covered by our data (December 2008 to September 2010). This stability is the result of two opposite effects. On the one hand, there is a decrease in the level of anger, which reduces the willingness to default; on the other hand, learning about the cost of defaulting, over time, increases the willingness to default. Given the stability in the willingness to default per given size of shortfall, the most likely cause of the increased proportion of strategic default between March 2009 and September 2009 is the decline in housing prices. While aggregate housing prices continued to slide over the sample period, the decline in the areas where more homeowners have negative equity are concentrated up to mid-2009 (see Figure 11). As of the second quarter of 2009 housing prices stabilized in the areas where they had declined the most in the previous period, but they continued to slide

in the areas where they had not dropped much before. As a result, the percentage of households with negative equity, which increased dramatically from the second quarter of 2008 to the second quarter of 2009, stabilized, thereby stabilizing the frequency of strategic defaults after September 2009.

The rest of the paper proceeds as follows. Section I introduces the theoretical framework. Section II describes the new survey data used in the paper. Section III presents evidence on the importance of strategic default. Section IV presents results on the determinants of strategic default. Section V discusses possible reasons for the increase in strategic default over time. Conclusions follow in Section VI.

I. The Theoretical Framework

The narrowest economic framework would hold that in nonrecourse states a household will default whenever the value of the mortgage exceeds the value of the house (e.g., see White (2009)). While negative equity is a necessary condition for strategic default, it is not sufficient. Even in nonrecourse states, there are frictions that make defaulting less appealing.

Consider a borrower who at time t owns a house worth H_t and faces a mortgage balloon payment equal to D_t. From a purely financial point of view the borrower will not default as long as $H_t > D_t$. In the decision whether to default strategically, however, there are considerations other than the financial gain or loss from defaulting. For example, by not defaulting, a borrower enjoys nonmonetary benefits (living in a house adapted to his or her needs), while by defaulting he faces costs that can be both monetary (relocation, higher cost of borrowing in the future) and nonmonetary (the social stigma associated with defaulting and the possible psychic cost of doing something immoral). Let us define K_t as the net benefit of not defaulting at t. Then a borrower will not default if

$$H_t - D_t + K_t > 0.$$

If the borrower does not have a balloon payment due, then his decision of whether to default strategically is more complex, because he must trade off the decision to default today with postponing the decision and possibly defaulting tomorrow. In addition, the option to default tomorrow is conditional on the ability of the borrower to serve his mortgage, which is highly correlated with the probability of remaining employed. If he loses the job, the borrower is likely to default next period and thus loses the value of the option. Let $V_T = H_T - D_T + K_T$,where T is the day the balloon payment is due. Then the value of not defaulting at T–1 is

$$V_{T-1} = h_{T-1} - m_{T-1} + K_{T-1} + (1 - \pi_{T-1})E_{\max}\{V_T, 0\},$$

where h is the monetary value of the housing services enjoyed between time $T - 1$ and T, m is the mortgage payment between T–1 and T, π_{T-1} is the probability of becoming unemployed, and E is the expectation operator. The

value of not defaulting at a generic date t is then

$$V_t = h_t - m_t + K_t + (1 - \pi_t)E_{\max}\{V_{t+1}, 0\}.$$

From (1), the decision to default strategically at a generic time t can be described by the following relationship

$$\text{Strategic Default} = F(H - D, h, m, p, K).$$

Therefore, the determinants of strategic default can be grouped into three categories: the size of the shortfall ($H - D$), the pecuniary, and nonpecuniary costs of defaulting (including the bite of morality and of social stigma), and the option value of not defaulting today. Below we discuss the empirical counterparts of these categories.

A. *Shortfall*

One advantage of the survey method is that we can confront people with different sizes of shortfalls (see Section II.B). This shortfall is divided by the self-reported value of the house.

B. *Pecuniary Costs*

There are significant pecuniary relocation costs, which include difficulty in (cost of) renting or buying a new house and moving expenses. To add to these costs, there is some specificity in the housing stock. Most people remodel their house to fit their needs. After this remodeling they are likely to pay a premium for their house versus a similar house with the same general characteristics. As proxies for these relocation costs we use the age of the respondent (the older the individual, the higher the relocation cost), the number of children (the more children, the higher the relocation cost), and whether the respondent bought the house more than 5 years ago (the longer the tenure, the stronger the attachment to the house and thus the higher the relocation cost).[4]

In addition to relocation costs, a default severely affects an individual's credit rating. In the sixth to eighth waves, we find that 87.7% of the respondents consider maintaining their credit rating "important" or "very important." Unfortunately, there is too little variation to identify any effect of this response on the willingness to default. While we do not have data on the credit rating itself, we observe other characteristics (such as income and age) that should proxy for it.

If the mortgage is a recourse loan, an individual faces the risk of being forced to pay the remaining amount if the lender comes after him with a deficiency judgment. Thus, more risk-averse individuals should be less likely to default. Also, richer people should be less likely to default. As a proxy for income, we have a self-reported income bracket.

[4] In the first survey, we cannot distinguish between the purchase and the refinancing of the house.

C. Option Value

In the presence of moving costs, relocation is a (partially) irreversible investment with an uncertain payoff. Thus, there is some value in waiting. With uncertain housing prices, the option to wait is more valuable because the higher the volatility of housing prices, the higher the expectation that they will recover. Since the survey asks about the long-term expectations for housing prices, we use those. The value of this option is smaller if a person fears being forced into default in the future as result of becoming unemployed. Hence, we use the subjective probability of becoming unemployed as a measure of the value of this option.

D. Nonpecuniary Costs

In addition to the purely economic reasons above, individuals may have other considerations that affect their willingness to default. Default can be perceived as morally wrong and as such something to avoid if not at all costs, at some significant cost. Moral considerations, if widespread, may strongly mitigate the likelihood that American households default on their mortgage, even when faced with a large home equity shortfall.

People have been shown to be more likely to inflict a loss on others when they have suffered a loss themselves, especially if they consider the loss unfair (Fowler, Johnson, and Smirnov (2005)). Accordingly, we expect that a homeowner is more likely to default strategically when that individual feels treated unfairly. If people respond to the sense of unfairness by asking for more regulation (Di Tella and MacCallough (2009)), demand for regulation can be used to measure the level of unfairness they feel. The ability to ask people questions about their moral positions and their other feelings is another advantage of the survey method. We describe these variables in the next section.

Finally, even amoral people can choose not to default when it is in their narrow economic interest to do so because of the social costs this decision entails. In a society where the vast majority of people think it is immoral to default when able to repay, people who default can pay a social cost or stigma (Fay, Hurst, and White (2002) and Gross and Souleles (2002)). In this context, the perceived cost of a default decision might be affected by the frequency with which people default. For this reason, we ask if survey participants know people who defaulted (strategically and nonstrategically); we also use the percentage of foreclosure, assuming that the more common it is for people to default, the more socially acceptable it is to do so. However, interpretation of this variable is ambiguous. Observing a default, one learns about both the subjective costs of defaulting (e.g., how painful it is for children to move) and the objective costs (how great the social stigma is and how likely a bank is to go after a borrower for the difference). While strategic defaults provide information about both aspects, nonstrategic defaults provide information mostly about the subjective aspects since lenders have fewer incentives to go after a borrower who is in financial distress.

II. The Survey Data

A. Why Survey Data?

Survey data have the obvious drawback that the data are responses to hypothetical questions, rather than actual decisions with monetary consequences. Survey responses can thus be easily affected by the framing of the question. However, since the framing here is common, any bias induced by it should not affect the cross-sectional variability of the answers. The responses can therefore provide some insights into the determinants of people's attitudes toward strategic default.

By the same token, survey data have several advantages and hence have been increasingly used in financial economics (e.g., Graham and Harvey (2001)). First, they allow us to study how households would behave if their home equity were to reach negative levels not common yet. One problem in studying the 2008 crisis is that it was so extreme in its intensity that one has to strongly believe in linearity to extrapolate estimates obtained during the previous recessions to predict the outcome of the current one.

Second, by asking about a person's willingness to default at different levels of negative equity we can measure the effect of the shortfall in equity while keeping all the other individual characteristics constant, including the level of wealth. As we argue below, this measure is useful from a policy point of view in assessing the potential impact of further deterioration in real estate prices in the areas worst hit.

Third, survey data provide an opportunity to separate contagion effects from sorting effects, which is difficult to do with field data. By asking questions about social and moral attitudes toward default, we can identify whether the high propensity to default in areas where foreclosures are more frequent is due to a clustering in those areas of individuals prone to default or to a contagion effect.

Finally, survey data allow us to ask about other attitudes and perceptions of the respondents that are not otherwise observable and that can be used to disentangle where certain effects—such as the correlation between knowing somebody who defaulted strategically and willingness to default strategically—come from.

B. Our Main Survey Data

Our main data source is the Chicago Booth Kellogg School Financial Trust Index survey. Details about the survey and its design are provided in the Internet Appendix.[5] Each survey, conducted by Social Science Research Solutions, collects information on a representative sample of 1,000 American households. The main purpose of these surveys is to study how the level of trust that people have in the financial system changes over time. These surveys include variables that can help us assess the frequency and determinants of strategic default.

[5] The Internet Appendix may be found in the online version of this article.

The interviews for each wave of the survey took place in the third week of the last month of each quarter from December 2008 to September 2010.[6] One adult respondent in each household was randomly contacted and asked whether he or she was in charge of household financials, either alone or together with a spouse. Only individuals who claimed such responsibility are included in the survey. The survey collected information about demographics, homeownership, the purchase date of the house, and the fraction borrowed. Most of the questions in the various waves remained the same.

While the survey collects information for both renters and homeowners, we restrict our analysis to homeowners for two reasons. First, if there are significant differences in the characteristics of homeowners versus nonhomeowners, to predict actual defaults we should focus on the responses of the former and not the latter. Second, the question is more realistic for a homeowner, who might face this decision, than for a renter, who might never face it and does not have a clear sense regarding the costs of leaving a house that one owns.

C. Strategic Default Variables

To elicit information about individuals' willingness to commit strategic default, we ask the following question: "If the value of your mortgage exceeded the value of your house by $50K would you walk away from your house (i.e., default on your mortgage) even if you could afford to pay your monthly mortgage?" Among the homeowners, only 8.9% answered this question in the affirmative (see Table I).[7] For those who answered in the negative at a shortfall of $50K, we then ask, "If the value of your mortgage exceeded the value of your house by 100K, would you walk away from your house (i.e., default on your mortgage) even if you could afford to pay your monthly mortgage?" Of the respondents, 23% answered "yes."

In Figure 1, we report the behavior over time of the willingness to default both at $50K and at $100K. The fluctuations over time are very modest and a formal test rejects any time trend. In Figure 2, we report the willingness to default as a function of the shortfall's value relative to the value of the house declared by each household (Panel A). The willingness to default is clearly increasing over the relative value of the shortfall, with only 7.4% of respondents willing to default when the shortfall is 10% of the value of the house and 12.4% when this value is between 40% and 50%. As Figure 2 shows, not only the relative value,

[6] The survey was conducted using International Communication Research's (ICR) weekly telephone omnibus service. In waves 1 to 4, ICR used a fully replicated, stratified, single-stage random-digit-dialing sample of landline telephone households. In waves 5 to 8, ICR used both landline and cellular phones. Wave 5 has a stratified sample according to both methodologies. Hence, the difference in the level of each variable computed using the new and old sample methodologies provides a measure of the correction we need to apply to surveys 1 to 4 to make them comparable to waves 5 to 8. In the time-series graphs (and only in those) we use this correction for waves 1 to 4.

[7] In various waves we experimented with higher amounts. For example, in the first wave we used $300K, in the second $200K, and in the third to sixth $150K. The results for these levels are not very different from those for a $100K shortfall and therefore we omit them from this paper.

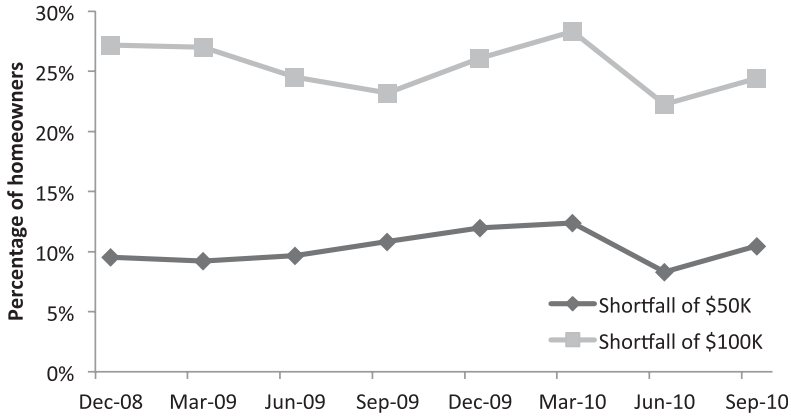


Figure 1. Percentage of homeowners willing to default strategically. This figure shows the fraction of homeowners who say they are willing to default when the value of their home equity falls short of the value of the loan by $50K and $100K even if the homeowner can afford to pay the monthly mortgage costs.

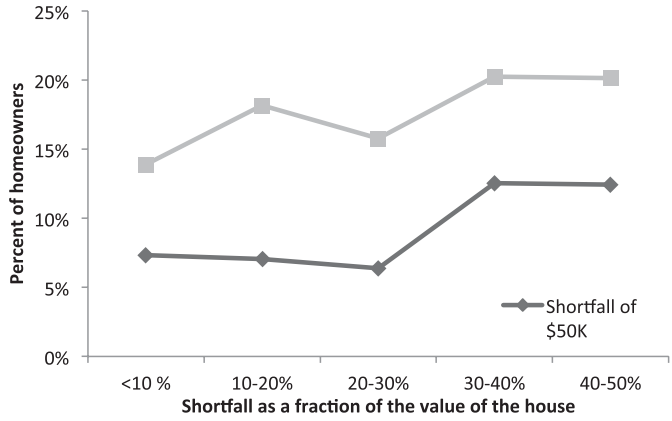
but also the absolute value, matters. Per given relative value of a shortfall, roughly 7% more households are willing to default when the shortfall is $100K instead of $50K.

D. Morality of Strategic Default

We also ask respondents "Do you think that it is morally wrong to walk away from a house when one can afford to pay the monthly mortgage?" A large majority (82.3%) responds positively to this question. As Figure 3 shows, this percentage is roughly constant over time. Although considering strategic default morally wrong does not prevent people from doing so, the propensity to default strategically is much higher for people who think strategic default is morally acceptable.

In the first two surveys, we asked the morality question after the willingness to default question. It is possible that this order may affect the willingness to state that default is not immoral. In particular, a respondent who just answered that he will default might try to justify his choice by saying that he does not consider this choice immoral. To address this concern, from the third wave onward we randomized the order of the morality and the willingness to default questions, with half of the data having the morality question first and half of the data having the morality question second. When we ask the morality question first, 85% of the respondents state that defaulting strategically is immoral, while when we ask the morality question after asking the willingness to default question that percentage drops to 81%. This difference is statistically significant, suggesting that the answers are not invariant to the order, a problem we deal with in Section IV.B. The same is true for the default question.

A. Percentage defaulting and relative shortfall



B. Percentage defaulting and absolute shortfall for different values of individual wealth

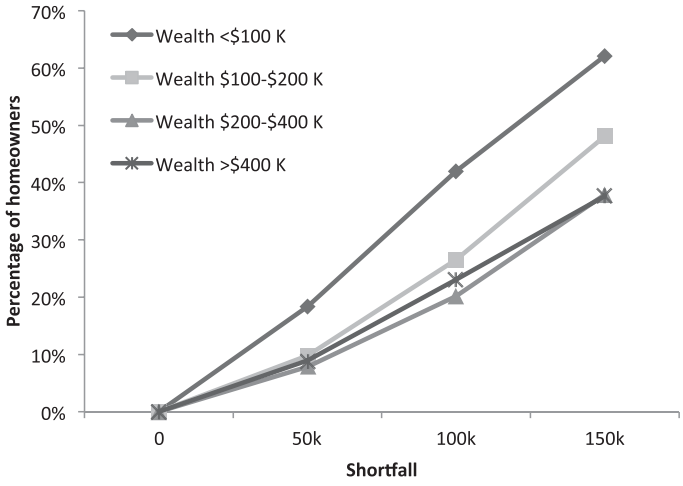


Figure 2. Percentage of homeowners willing to default as a fraction of the size of the shortfall. This figure shows the fraction of homeowners who say they are willing to default when the value of their home equity falls short of the value of the loan by $50K and $100K even if the homeowner can afford to pay the monthly mortgage costs as a function of the incidence of this shortfall on the value of the house (Panel A) or the level of the shortfall (Panel B).

If we ask the morality question first, the willingness to walk away when the shortfall is –$50K drops to 6.2% from 10.6%.

For consistency in all the time-series comparisons for these variables, we only use the half-sample in which the morality question is asked after the default question.

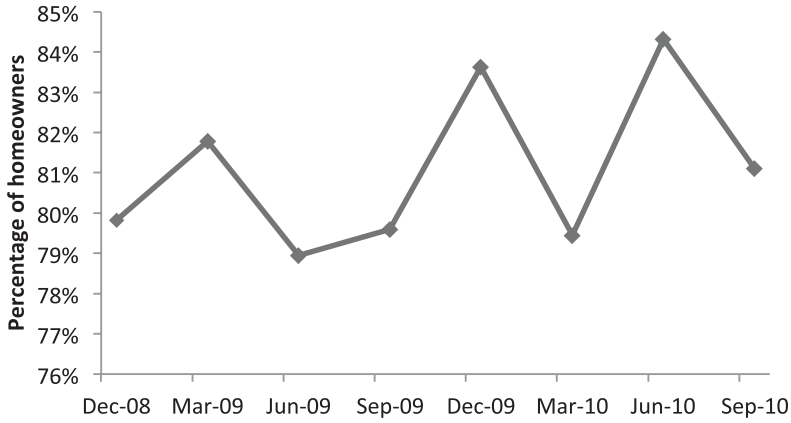


Figure 3. Fraction of homeowners who think it is morally wrong to walk away. This figure shows the percentage of homeowners responding positively to the following question: "Do you think that it is morally wrong to walk away from a house when one can afford to pay the monthly mortgage?"

E. Other Attitudes

To measure the degree of a respondent's disenfranchisement, we ask "On a scale from 1 to 5, with 1 being 'not angry at all' and 5 being 'very angry,' how angry are you about the current economic situation?" Figure 4(A) reports the percentage of people who respond "angry" or "very angry." In December 2008 and March 2009 this percentage was very high (more than 60%), but it has dropped to around 50% since June 2009.

A measure of people's resentment with respect to the economic situation is their level of trust toward banks, which are often seen as the main culprit of the 2008 crisis. To capture such trust, we ask "On a scale from 1 to 5 where 1 means 'I do not trust them at all' and 5 means 'I trust them completely,' can you please tell me how much do you trust banks?" Figure 4(A) reports the percentage of people who trust banks at the level of 4 and 5. This percentage is slightly increasing over time, moving from 35% in December 2008 to 43% in September 2010.

In all the waves (except March 2009), the survey includes the questions: "Do you think the government should intervene to impose a cap on executive compensation?" and "Do you think that the government should intervene to regulate the financial sector more?" Figure 4(B) reports the proportion of people who answered affirmatively to these two questions. Interestingly, the percentage of respondents who would like a government cap on executive compensations drops from 62% in December 2008 to 56% in March 2010, while the percentage of people who want to see greater regulation of financial institutions stays between 50% and 55% in the period under analysis.

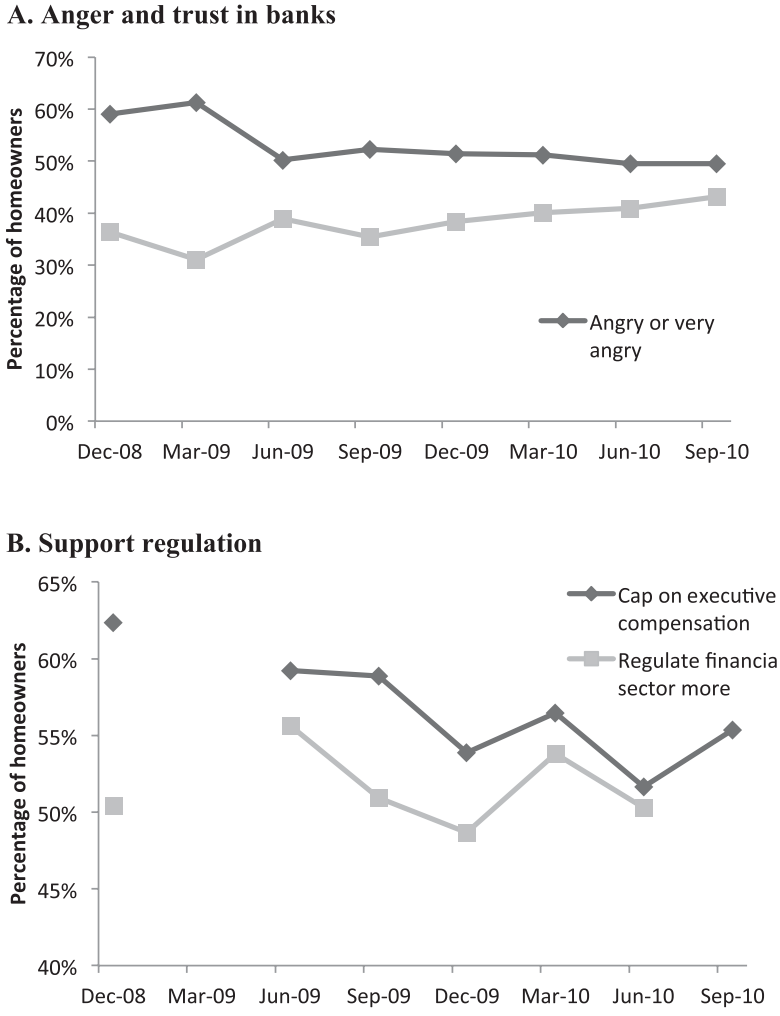


Figure 4. Evolution of resentment and trust. In Panel A, "angry" is the percentage of homeowners who report being "angry" or "very angry" about the economic situation following the financial crisis. "Trust in banks" is the percentage of homeowners who report they trust banks completely or a lot in a question asking how much people trust banks on a scale from 1 (no trust) to 5 (completely). In Panel B, "Cap on executive compensation" and "Regulate financial sector" are the percentage of homeowners answering yes to the questions: "Do you think the government should intervene to impose a cap on executive compensation?" and "Do you think that the government should intervene to regulate the financial sector more?" respectively.

F. Percentage of People Who Know Defaulters

To measure the diffusion of actual strategic defaults, from March 2009 onward the survey asks "How many people do you know who have defaulted on their house mortgage?" Respondents who know at least one such individual are

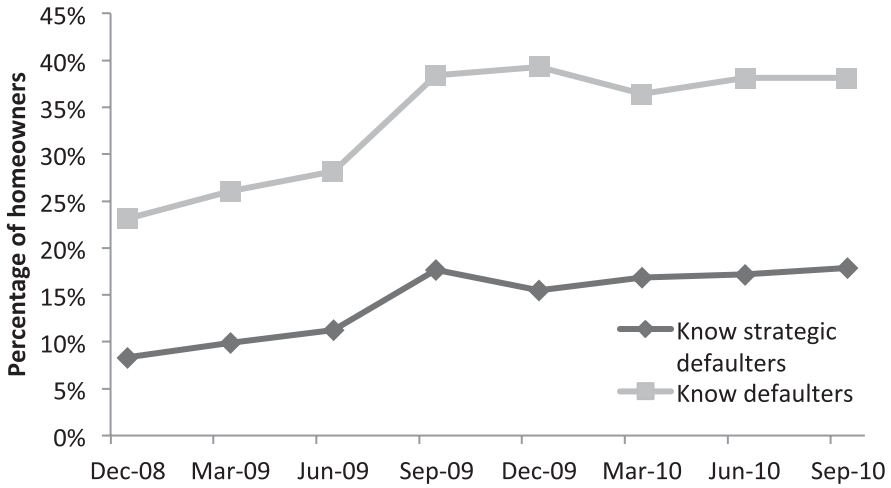


Figure 5. Percentage of people who know a defaulter. "Know defaulters" is the percentage of homeowners who report they know at least one person who has defaulted on his/her mortgage when answering the question "How many people do you know who have defaulted on their house mortgage?" "Know strategic defaulters" is the percentage of homeowners who know at least one strategic defaulter based on the answers to the question: "Of the people you know who have defaulted on their mortgage, how many do you think walked away even if they could afford to pay the monthly mortgage?"

also asked "How many people do you know who have walked away from his/her house (that is, defaulted on their mortgage) even if he/she could afford to pay the monthly mortgage?"

Figure 5 reports the percentage of people who know somebody who defaulted and the percentage of people who know somebody who defaulted strategically. In this case, there is a clear trend upward, which is confirmed by a simple *t*-test. This is hardly surprising since during this period the number of defaults increased.

One might wonder how realistic the numbers obtained from survey data are, so to cross-validate our results from Figure 5, in Figure 6 we plot the percentage of survey respondents in a state who know at least one person who has defaulted against the average percentage of mortgaged houses in foreclosure according to RealtyTrack.com. As Figure 6 shows, there is a strong positive correlation between the two.

G. Other Variables

To capture the diffusion of defaults in a certain area, we construct a ZIP code–level variable with the percentage of mortgages in foreclosure. From RealtyTrack.com, we collected the number of foreclosures in the last month of the quarter corresponding to each survey for each ZIP code represented in the survey. We then multiply this number by 12 (to turn it into an annual figure)

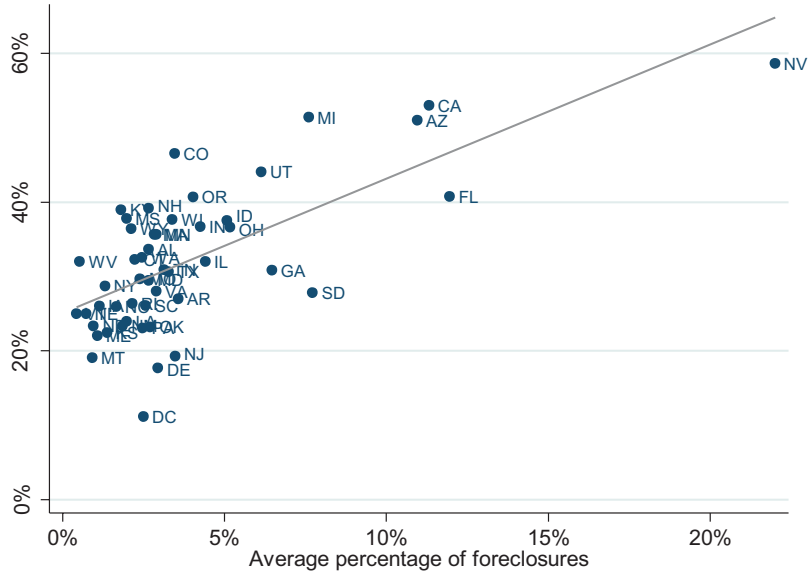


Figure 6. Perceived and actual defaults. This figure shows the percentage of survey respondents in a state who know at least one person who has defaulted, against the average percentage of mortgaged houses in foreclosure according to RealtyTrack.com.

and divide it by the number of mortgages in the same ZIP code. (The number of outstanding home-related loans is from the Analytical Services group at Equifax (Mian and Sufi (2009)).[8]) The results, presented in Table I, Panel A, show that the average percentage of foreclosure is 4.6%, with a median of 2.5% and a standard deviation of 6.6%.

From the second wave onward, the survey directly asks for an estimate of the home's value. Unfortunately, the first survey does not contain a similar question. To compute a value for the first survey, we average the value of the house in the second survey by income class and then apply this value to respondents in the first survey on the basis of their declared income bracket. The value of the house and the percentage that \$50K and \$100K represent vis-á-vis this value are reported in Table I, Panel A. On average, \$50K represents 37% of the value of the house and \$100K represents 73%. To measure individuals' attachment to their current house, the survey asks how long ago they bought their home.[9] We find that 69% of the respondents bought their house more than 5 years earlier.

Besides standard demographic variables, the survey also collects information on other more specific ones, summarized in Table I, Panel A. We measure risk attitudes by using a question previously asked and validated by Dohmen et al.

[8] We thank Amir Sufi for providing us with this data and Equifax for allowing us to use it.

[9] Unfortunately, in the first survey this question is mixed with the refinancing decision ("When did you buy or last refinance your house."). From the second wave onward, it is separate.

(2011): "On a scale from 1 to 10, where 1 is unwilling and 10 fully willing, are you generally a person who is willing to take risk?" To obtain a measure of risk aversion, we recode it so that 1 indicates a person fully willing to take risk and 10 a person totally unwilling to take risk. On average, this measure equals 6.2 (standard deviation 2.6).

To measure individual expectations about housing price appreciation, we ask participants "In the next 5 years do you think house prices will . . . ," where there are five possible responses that range from "1: Increase a lot (greater than 20%)" to "5: Decrease a lot (greater than –20%)." On average, people expect a moderate increase in housing prices over the next 5 years (between 5% and 20%). Once again we recode the variable so that 1 means decrease a lot and 5 increase a lot.

We also elicit a subjective probability of unemployment by asking "On a scale from 0 to 100, where 0 equals 'absolutely no chance' and 100 equals 'absolutely certain,' what do you think are the chances that you will lose your job during the next year?" On average, respondents think they have a 12% chance of becoming unemployed within the following 12 months, with a median equal to zero and substantial heterogeneity (standard deviation 25%).

Starting with the fifth wave we also ask "When people default on their mortgage, the lender repossesses the house. Sometimes the mortgage is more than the value of the house. On a scale from 0 to 100, where 0 equals "absolutely no chance" and 100 equals "absolutely certain" what do you expect are the chances that the lenders will go after people who default on their mortgage for the full amount of the mortgage?" On average, this probability is 53%.

To test whether respondents are aware of the difference between recourse and nonrecourse states, we attribute to each state the label "recourse" and "nonrecourse" according to the classification of Ghent and Kudlyak (2009). As Figure 7 shows, the distribution of the perceived probability that a lender will go after a defaulted mortgage with a deficiency judgment is almost identical between recourse and nonrecourse states.

III. Diffusion of Strategic Default

A. Temporal Trend in Strategic Default

To measure the diffusion of strategic defaults we can simply take the ratio between the number of strategic defaulters and the number of total defaulters each respondent knew. As Figure 8 shows, this method suggests that in March 2009 26.4% of defaults were strategic. By September 2010, this figure rose to 35.1%. Most of the increase took place between March and September 2009, while the estimated amount is relatively stable afterward.

To validate our results we compare them with several subsequent studies that follow a different approach. A study by Experian and the consulting firm Oliver Wyman tries to measure strategic default by using borrower-level data. They define a borrower as having defaulted strategically if he goes straight from current to 180 days late while staying current on all his other debt obligations,

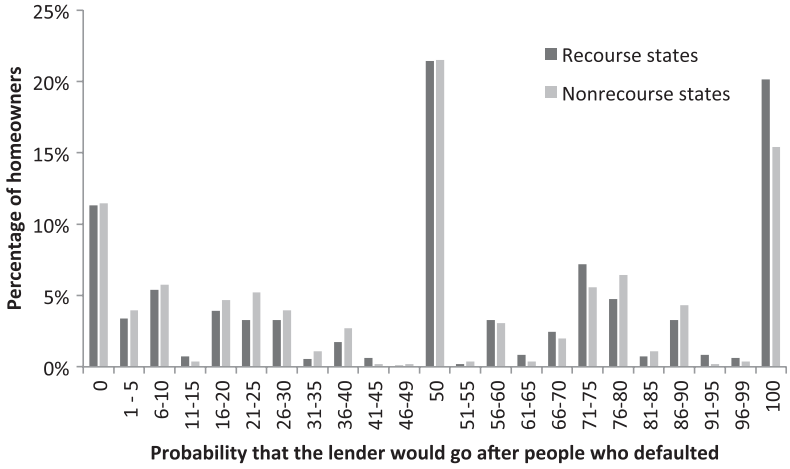


Figure 7. Perceived probability that lender would go after defaulter: Recourse and nonrecourse states. This figure plots a histogram of the subjective probability that lenders go after defaulters in recourse and nonrecourse states using the answers to the question "When people default on their mortgage, the lender repossesses the house. Sometimes the mortgage is more than the value of the house. On a scale from 0 to 100, where 0 equals "absolutely no chance" and 100 equals "absolutely certain," what do you expect are the chances that the lenders will go after people who default on their mortgage for the full amount of the mortgage?"

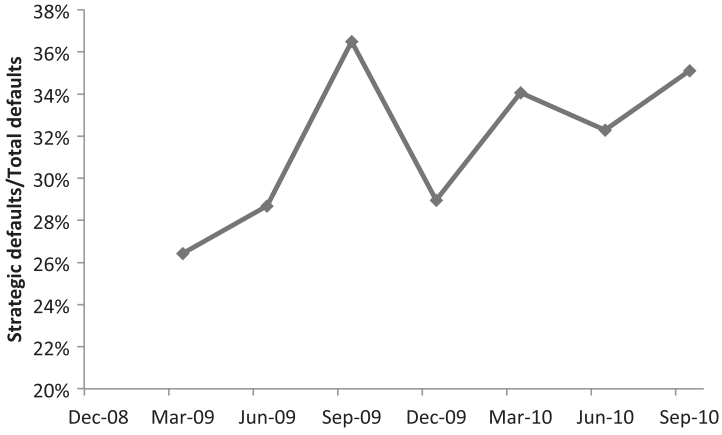


Figure 8. Ratio of strategic defaults to total defaults. The figure shows the ratio of strategic defaults to total defaults. This is estimated by dividing the number of people who respondents know have defaulted strategically by the total number of people who respondents know that have defaulted on the basis of the following two questions: "How many people do you know who have defaulted on their house mortgage?" and "Of the people you know who have defaulted on their mortgage, how many do you think walked away even if they could afford to pay the monthly mortgage?"

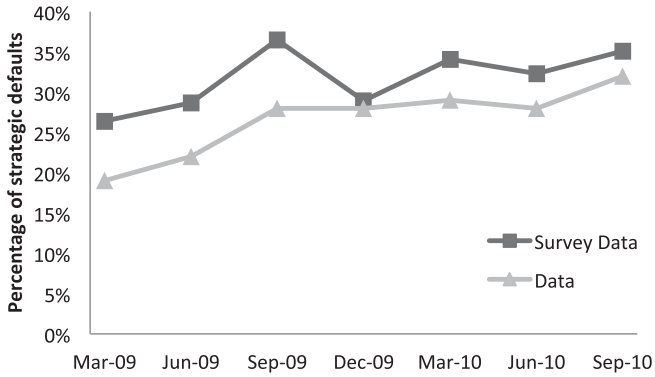


Figure 9. Percentage of strategic defaults: Survey versus actual data. This figure plots the percentage of defaults considered strategic according to our survey method versus that derived from the Piskorski, Seru, and Vig (2010) data set. These data contain origination and payment information on mortgage borrowers in the United States and are combined with credit bureau information to assess the nature of payments made by a delinquent borrower on other accounts. A borrower is classified as a strategic defaulter if he goes from current to 60 days late on his mortgage for the first time while remaining current on credit card balances for the following 6 months. For more details see Mayer et al. (2011).

such as credit cards and auto loans. The idea is that, if somebody pays the credit card but not the mortgage, it is probably because he wants to default on the mortgage, not because he must. While this method underestimates strategic default (by construction, borrowers with no other debt and borrowers who by accident have been late on a mortgage payment are not considered strategic), this study estimates that, in 2008, 17% of all U.S. defaults were strategic, although that figure differs tremendously across groups and regions. For instance, while 27% of defaults among people with high credit scores appear to be strategic, that figure jumps to 40% in California. Tituppatur, Chang, and Egan (2010) use a similar strategy to identify strategic default from 2007 to 2010. They find that at the beginning of 2007 the percentage of strategic default was close to zero, whereas by December 2008 it had risen to 7% and by February 2010 to 12%.

Amit Seru has kindly created for us a similar statistic by merging the data in Piskorski, Seru, and Vig (2010), which contains origination and payment information on mortgage borrowers in the United States, with credit bureau information to assess the nature of payments made by a delinquent borrower on other accounts. A borrower is classified as a strategic defaulter if he goes from current to 60 days late on his mortgage for the first time while remaining current on credit card balances for the following 6 months. For more details see Mayer et al. (2011). As Figure 9 shows, our data track the actual data very well (both in level and in time trend).

A study by the Amherst Securities Group (Goodman (2009)) takes a different approach. It shows that, in areas where homeowners generally were not underwater, less than 1.5% of subprime mortgages became nonperforming

each month of the third quarter of 2009, while, in areas where the average mortgage exceeded the current value of a house by 20% or more, the rate of monthly subprime defaults was 4.5%. The difference between the two rates probably is not due to homeowners' ability to pay because the study corrects for unemployment. The assumption, therefore, is that the difference is due to homeowners' willingness to pay when they see how much more expensive their mortgages are than their houses. The difference between the two default rates—the 1.5% "natural" rate and the 4.5% rate in areas where home prices dropped significantly—suggests that, in those areas, two-thirds of defaults in subprime mortgages appear to be strategic.

All of the above studies suggest that strategic defaults represent an important fraction of defaults when home equity is negative. They also indicate that, as in our sample, this percentage had risen during 2009. In what follows, we analyze this important phenomenon.

B. Do Strategic Default Costs Increase with Wealth?

From a policy point of view, it is important to understand how the willingness to default changes with the size of the home equity shortfall. Unfortunately, this comparative static is difficult to derive with actual data, since individuals who have a different level of shortfall have ex ante different characteristics that cannot be easily controlled for in empirical analysis. In this respect surveys are superior—our survey asks the same person about his willingness to default strategically for different levels of shortfall and hence we can observe the effect of a change in shortfall for given individual characteristics.

Table I, Panel B presents the fraction of households declaring that they would default strategically as a function of their wealth and shortfall. In a given row, comparisons across columns allow us to see the effect of a change in the relative size of the shortfall while holding individual wealth constant. At low levels of wealth (i.e., in the first couple of rows) a \$50K increase in the shortfall increases the fraction of households who default by 14 percentage points (starting at zero shortfall), by 21 percentage points (starting at \$50K shortfall), and by 17 percentage points (starting at \$100K shortfall). Thus, the relationship between default and shortfall appears to be nonlinear, with a peak in the sensitivity of default to shortfall when the value of the shortfall is 50% of the value of the house. The pattern looks similar in the next row, but when the value of the house exceeds \$400K, the derivative with respect to the shortfall seems to peak at a higher level of shortfall. As Figure 2(B) shows, the shape of the relation between default and size of the hypothetical shortfall changes with the level of wealth.

To understand how the overall cost of default may vary with the level of wealth it is useful to formalize the default decision. Let $U(W_i - S)$ denote the level of utility for an individual i with initial assets W_i and home equity shortfall S who chooses not to default. The utility if he defaults is $U(W_i - C_i)$, where C_i denotes individual i's monetary-equivalent cost of defaulting, which includes both pecuniary and nonpecuniary components. Thus, an individual defaults if

$S > C_i$. Let $F(C_i)$ be the distribution of the cost of default for the population. If the distribution of C_i were independent of wealth, the fraction of people defaulting at different levels of the relative shortfall should be constant, given that in our setup S is the same for all individuals. In other words, looking at Table I, Panel B the fraction of defaulters should be constant along the columns. This is clearly not the case. Thus, we can reject the conjecture that the overall cost of default is independent of wealth.

An alternative hypothesis is that the overall cost of default is proportional to wealth, that is, $C_i = c_i W_i$. In this case an equal increase in the relative size of the shortfall should have a similar effect regardless of whether it results from an increase in the absolute value of the equity loss or from a decrease in the value of individual wealth. Formally, let $s_i = S/W_i$ denote the relative shortfall. If c_i were invariant to wealth, doubling s_i by doubling S or halving W should have the same effect on the fraction of defaulters, since an individual will default when $s_i > c_i$. Once again, Table I, Panel B tells us this is not the case.

To see this we compare the fraction of people who are willing to default when the shortfall is \$50K and the house value is in the \$200K to \$400K range versus when it is in the \$100K to \$200K range. Moving from the former to the latter corresponds to a doubling of the relative shortfall (from 1/6 to 1/3) and leads to an increase in the willingness to default from 8.6% to 11.3%. Let us now compare it to a doubling of the shortfall caused by an increase in the dollar value of the shortfall. This can be computed by comparing the shortfall at \$50K with a shortfall at \$100K per given row. For example, among people with a house value of \$100K to \$200K, the willingness to default increases from 11.3% to 27.8% when we double the shortfall. We observe a similar increase in the other rows.

Taken together, the results above show that doubling the relative level of the shortfall by doubling the absolute value of the shortfall has a much larger effect than doing so by halving the value of the house. This implies that the overall cost of defaulting increases less than proportionally with wealth. This conclusion is consistent with the patterns in Figure 2(B), where we see that the frequency of default decreases with wealth, but less than proportionally.

IV. Determinants of Attitudes toward Strategic Default

In this section, we study the determinants of the propensity to walk away from a mortgage that exceeds the value of a house by \$50K and \$100K. Unless otherwise specified, all the regressions are probit models and the reported coefficients are the marginal effects computed at the sample mean of the independent variables. In these regressions, we use both the subsample in which strategic default is asked first and the subsample in which morality is asked first. Since the allocation across the two subsamples was properly randomized, this pooling does not impact the relationship between the other variables and willingness to default.

A. The Role of Demographic Variables

In Table II, we start by analyzing the effects of some demographic variables. In Table II, Panel A the dependent variable is equal to one if the respondent states he would walk away if his mortgage exceeds the value of his house by $50K.

Blacks and Hispanics appear much more likely to walk away from an underwater mortgage. Blacks are 87% more likely than the sample mean to default strategically than whites, Hispanics 82%. By contrast, women are 41% less likely to default strategically. This latter effect is not due to a difference in risk aversion since it continues to exist when we control for risk aversion in column 5, and is consistent with a growing body of experimental evidence that women behave in a more ethical way (e.g., Eagly and Crowley (1986) and Eckel and Grossman (1998)). The geographical dummies are also significant, but this effect disappears when we control for other economic differences.

In column 2, we include the ratio of the shortfall's size and the self-reported value of the house, which is a proxy for household wealth. The effect is positive and statistically significant. A one standard deviation increase in the shortfall relative to the value of the house leads to a 30% increase in the probability of strategic default. This effect is slightly lower after we control for other variables.

In column 3, we add life cycle factors to the regression. We include dummy variables equal to one if an individual is young (less than 35 years of age) or old (65 or older) and if the individual has kids. We find that younger people are more likely to walk away, but this effect is not statistically significant. Older people are 31% more likely to walk away. This effect survives other controls and is consistent with stronger incentives to default when a borrower's residual horizon shrinks and thus reputational costs fall. Surprisingly, the number of kids does not significantly increase the propensity to walk away.

In column 4 we control for economic incentives to default. The first variable we include is a dummy equal to one if the respondent states that he bought the house more than 5 years earlier. This measure proxies for the specific investments made in the house. As expected, this dummy has a negative coefficient—people who spent at least 5 years in their current house are 17% less likely to walk away in the presence of a negative shortfall—but this effect is not statistically significant.

We next include two proxies for the option value of waiting. One is the individual's expectation about future movements in housing prices. As expected, more optimistic expectations about future housing prices reduces the likelihood of walking away, but this effect is not statistically significant. The other is the subjective probability of becoming unemployed over the next 12 months. The higher this probability is, the less valuable it is to keep paying on an underwater mortgage since the individual will likely be forced to give up the house anyway. Consistent with this interpretation, the probability of unemployment increases the willingness to walk away in a statistically significant way: a one standard deviation increase in the probability of becoming unemployed

Table II

Demographic Determinants of the Decision to Default Strategically

The dependent variable is a dummy equal to one if the homeowner says he is willing to default when the value of his home equity equals $50K (in Panel A) or $100K (in Panel B) even if he can afford to pay the monthly mortgage costs. All other variables are as defined in the Internet Appendix. The reported coefficients are marginal effects estimated with a probit model and computed at the mean of the independent variables. All regressions contain a constant term (not reported) and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% /1% level.

Panel A: Walk away at $50K

	(1)	(2)	(3)	(4)	(5)
Black	0.077***	0.064***	0.063***	0.063***	0.064***
	(0.020)	(0.019)	(0.019)	(0.022)	(0.022)
Hispanic	0.073***	0.058**	0.062**	0.085***	0.083***
	(0.025)	(0.025)	(0.025)	(0.031)	(0.031)
Northeast	− 0.024**	− 0.017*	− 0.018*	− 0.011	− 0.010
	(0.009)	(0.010)	(0.010)	(0.011)	(0.012)
South	− 0.022**	− 0.018**	− 0.014	− 0.008	− 0.009
	(0.009)	(0.009)	(0.009)	(0.010)	(0.011)
West	− 0.028***	− 0.018*	− 0.017	− 0.024**	− 0.025**
	(0.009)	(0.010)	(0.010)	(0.011)	(0.012)
Female	− 0.037***	− 0.037***	− 0.038***	− 0.041***	− 0.038***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
High school		− 0.006	− 0.003	− 0.005	− 0.003
		(0.016)	(0.016)	(0.018)	(0.018)
College		− 0.009	− 0.010	− 0.003	− 0.004
		(0.009)	(0.009)	(0.010)	(0.010)
Shortfall% house		0.095***	0.095***	0.079***	0.080***
		(0.011)	(0.011)	(0.013)	(0.013)
Age ≤ 35			0.021	0.022	0.021
			(0.015)	(0.016)	(0.016)
Age ≥ 65			0.017*	0.026**	0.028**
			(0.009)	(0.011)	(0.011)
Kids			− 0.001	− 0.003	− 0.003
			(0.004)	(0.004)	(0.004)
Bought>5 years				− 0.016	− 0.015
				(0.011)	(0.011)
House price expectation				− 0.002	− 0.003
				(0.005)	(0.005)
Probability become unemployed				0.048***	0.047***
				(0.015)	(0.015)
Income ($100K)				− 0.019*	− 0.019*
				(0.010)	(0.010)
Risk aversion					− 0.002
					(0.002)
Nonrecourse state					0.005
					(0.010)
Observations	5,973	5,460	5,280	4,171	4,159

(*Continued*)

Table II—*Continued*

Panel B: Walk away at $100K					
	(1)	(2)	(3)	(4)	(5)
Black	0.105***	0.091***	0.095***	0.103***	0.106***
	(0.026)	(0.027)	(0.027)	(0.031)	(0.032)
Hispanic	0.094***	0.096***	0.110***	0.141***	0.138***
	(0.033)	(0.034)	(0.035)	(0.041)	(0.041)
Northeast	− 0.037**	− 0.025	− 0.026	0.000	0.001
	(0.016)	(0.017)	(0.017)	(0.020)	(0.020)
South	− 0.021	− 0.017	− 0.015	− 0.002	− 0.003
	(0.014)	(0.015)	(0.015)	(0.017)	(0.018)
West	− 0.062***	− 0.050***	− 0.050***	− 0.038**	− 0.040*
	(0.016)	(0.017)	(0.017)	(0.019)	(0.021)
Female	− 0.019	0.004	0.012	0.038	0.038
	(0.025)	(0.025)	(0.025)	(0.027)	(0.028)
High school	− 0.065***	− 0.038***	− 0.034**	− 0.016	− 0.016
	(0.013)	(0.014)	(0.014)	(0.016)	(0.016)
College	− 0.047***	− 0.056***	− 0.057***	− 0.067***	− 0.066***
	(0.011)	(0.012)	(0.012)	(0.013)	(0.013)
Shortfall% house		0.199***	0.195***	0.157***	0.161***
		(0.020)	(0.021)	(0.024)	(0.024)
Age ≤ 35			0.071***	0.068***	0.067**
			(0.023)	(0.026)	(0.026)
Age ≥ 65			0.051***	0.052***	0.055***
			(0.015)	(0.017)	(0.018)
Kids			− 0.016**	− 0.016**	− 0.016**
			(0.007)	(0.007)	(0.007)
Bought>5 years				− 0.026	− 0.025
				(0.017)	(0.017)
House price expectation				− 0.007	− 0.006
				(0.008)	(0.008)
Probability become unemployed				0.080***	0.080***
				(0.026)	(0.026)
Income ($100K)				− 0.073***	− 0.073***
				(0.015)	(0.015)
Risk aversion					− 0.002
					(0.003)
Nonrecourse state					0.008
					(0.017)
Observations	5,527	5,189	5,023	3,981	3,969

increases the likelihood of walking away by 13%. Similarly, more wealthy people are less likely to walk away: a one standard deviation increase in income decreases the likelihood of walking away by 12%. In an unreported regression we also control for education, but we find it to have no impact on the probability of walking away.

Finally, in column 5 we control for two other factors associated with to the risk of walking away. The first is risk aversion. By walking away, a homeowner risks being sued. Hence, more risk-averse individuals should be less likely to

walk away. As expected, the Dohmen et al. (2011) measure of risk aversion has a negative impact, but its coefficient is not statistically significant. By contrast, residents in nonrecourse states should be more likely to walk away because they face lower risk. The dummy variable has a positive coefficient, but this coefficient is not statistically different from zero. As we discuss in Section II.D, this is not that surprising since the respondents do not perceive a difference between recourse and nonrecourse states in the probability that a lender will go after a defaulted borrower.

In Table II, Panel B, we repeat the same regression with the dependent variable equal to one if the respondent states he would walk away if his mortgage exceeds the value of his house by $100K. The results are substantially the same.

To save on space, in all the subsequent tables we omit results on demographic controls; the full specification is available in the Internet Appendix.

B. The Role of Morality

A large majority (82.3%) of respondents state that it is immoral to walk away from a mortgage if one can afford to pay it. Does this moral stand affect the willingness to walk away? In Table III we try to answer this question. In Panel A we start by re-estimating the last specification in Table II, including in column 2 a dummy variable equal to one if the respondent answers that it is immoral to walk away. The coefficient is negative and highly statistically significant: people who answer that it is immoral to default are 9.9 percentage points less likely to walk away (110% of the sample average).

This coefficient, however, could be biased by the respondent's desire to be consistent in his answers. In fact, as we show in Section II.B, answers to the morality question and the default question depend upon the order in which these questions are asked. One way to address this measurement error problem is to employ our proxy for morality. We would like a variable that predicts morality but does not directly affect the decision to walk away. A measure of ideology might be a good candidate. Political convictions reflect different views of the world. In particular, they might reflect different views of individual versus social responsibilities in people's actions and different attitudes toward private ownership and contract enforcement. These different attitudes will affect judgments about the morality of strategic default. Therefore, the survey contains a self-reported political affiliation dummy equal to one if the respondent declares himself a Republican. As the first stage shows (column 4), this dummy is positively and statistically significantly related to the morality variable. The F-test statistic is 22.7, and thus this is not a weak instrument.

Column 3 reports the instrumental variable estimation when the Republican dummy is used as an instrument. The coefficient on morality remains negative and statistically significant. However, the magnitude of the coefficient increases dramatically. In general, this is an indication that the instrument violates the exclusion restriction and has a direct effect on the dependent variable.

Table III

The Effect of Morality on Strategic Default

The dependent variable is a dummy equal to one if the homeowner says he is willing to default when the value of his home equity equals $50K (in Panel A) or $100K (in Panel B) even if he can afford to pay the monthly mortgage costs. All other variables are as defined in the Internet Appendix. In Panels A and B, columns 1, 2, and 5, the reported coefficients are marginal effects estimated with a probit model (IV-probit in column 5) computed at the mean of the independent variables. In columns 3, 4, and 7 the reported coefficients are marginal effects estimated with a linear probability model (LPM). In the IV estimates "default is morally wrong" is instrumented with an indicator variable on whether the respondent is a Republican. In columns 6 and 7, we use only the observations for which the morality question is asked at the beginning. In Panel C, columns 1 and 2, we split the sample between people declaring positive and negative equity according to the survey. In columns 3 and 4 we split the sample between people with positive and negative equity, using data on median negative equity in the metropolitan area (Zillow.com). Not all people live in a metropolitan area, and Zillow.com does not provide data for every metropolitan area. In columns 5 and 6 we split the sample according to the size of the decrease in housing price at the state level, distinguishing between below and above median (data from the Federal Housing Finance Agency). All regressions contain a constant term (reported only for the linear specification) and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

Panel A: Walk away at $50K

	Probit		IV: First and Second Stage		LPM		LPM Bootstrap
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Morally wrong to walk away		−0.099***	−2.475***		−0.105***	−0.080***	−0.067**
		(0.015)	(0.226)		(0.015)	(0.025)	(0.028)
Shortfall% house	0.080***	0.079***	0.316**	−0.020	0.123***	0.079***	
	(0.013)	(0.013)	(0.126)	(0.025)	(0.022)	(0.029)	
House price expectation	−0.003	−0.002	−0.003	0.005	−0.001	0.006	
	(0.005)	(0.005)	(0.026)	(0.007)	(0.006)	(0.008)	
Probability become unemployed	0.047***	0.042***	0.173*	−0.010	0.048**	−0.021	
	(0.015)	(0.015)	(0.097)	(0.025)	(0.019)	(0.021)	
Income ($100K)	−0.019*	−0.018*	−0.010	0.029**	−0.009	−0.008	
	(0.010)	(0.010)	(0.054)	(0.012)	(0.009)	(0.013)	
Bought >5 years	−0.015	−0.017	−0.108*	−0.014	−0.019*	−0.015	
	(0.011)	(0.011)	(0.056)	(0.014)	(0.011)	(0.018)	
Risk aversion	−0.002	−0.003	−0.020**	−0.003	−0.003*	−0.004	
	(0.002)	(0.002)	(0.009)	(0.003)	(0.002)	(0.003)	
Nonrecourse state	0.005	0.006	0.023	−0.001	0.007	−0.001	
	(0.010)	(0.010)	(0.057)	(0.015)	(0.011)	(0.015)	
Republican				0.059***			
				(0.012)			
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	
Constant			1.324***	0.842***	0.187***	0.146**	
			(0.432)	(0.051)	(0.043)	(0.064)	
Observations	4,159	4,059	3,969	3,969	4,059	1,357	

(*Continued*)

Table III—*Continued*

Panel B: Walk away at $100K

	Probit		IV: First and Second Stage		LPM		LPM Bootstrap
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Morally wrong to walk away		−0.201***	−2.232***		−0.198***	−0.169***	−0.110***
		(0.021)	(0.361)		(0.020)	(0.035)	(0.037)
Shortfall% house	0.161***	0.164***	0.376***	−0.027	0.194***	0.143***	
	(0.024)	(0.024)	(0.126)	(0.026)	(0.028)	(0.043)	
House price expectation	−0.006	−0.005	−0.004	0.006	−0.005	0.010	
	(0.008)	(0.008)	(0.025)	(0.008)	(0.008)	(0.013)	
Probability become unemployed	0.080***	0.072***	0.180**	−0.004	0.069**	−0.024	
	(0.026)	(0.026)	(0.088)	(0.025)	(0.027)	(0.038)	
Income ($100K)	−0.073***	−0.073***	−0.139**	0.027**	−0.051***	−0.049***	
	(0.015)	(0.015)	(0.066)	(0.013)	(0.012)	(0.017)	
Bought >5 years	−0.025	−0.026	−0.092*	−0.015	−0.027*	−0.007	
	(0.017)	(0.017)	(0.051)	−0.015	(0.016)	(0.026)	
Risk aversion	−0.002	−0.002	−0.011	−0.003	−0.002	−0.006	
	(0.003)	(0.003)	(0.008)	(0.003)	(0.003)	(0.004)	
Nonrecourse state	0.008	0.008	0.014	−0.003	0.010	0.007	
	(0.017)	(0.017)	(0.053)	(0.015)	(0.016)	(0.025)	
Republican				0.056***			
				(0.012)			
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	
Constant			1.310***	0.830***	0.379***	0.308***	
			(0.455)	(0.052)	(0.059)	(0.097)	
Observations	3,969	3,889	3,804	3,804	3,889	1,308	

Panel C: Robustness

	Underwater-reported		Underwater-Zillow		Level of drop in price	
	Positive equity (1)	Negative equity (2)	Positive equity (3)	Negative equity (4)	Low drop in price (5)	High drop in price (6)
Morally wrong to walk away	−0.089***	−0.292***	−0.060**	−0.134***	−0.065***	−0.121***
	(0.015)	(0.085)	(0.026)	(0.031)	(0.021)	(0.020)
Shortfall% house	0.070***	0.122***	0.066**	0.098***	0.066***	0.086***
	(0.013)	(0.042)	(0.027)	(0.025)	(0.019)	(0.016)
House price expectation	−0.000	−0.024	0.005	−0.011	−0.002	−0.001
	(0.005)	(0.018)	(0.010)	(0.008)	(0.007)	(0.006)
Probability become unemployed	0.045***	−0.043	0.004	0.041*	0.047**	0.035*
	(0.015)	(0.067)	(0.031)	(0.024)	(0.023)	(0.018)
Income ($100K)	−0.021**	−0.012	−0.010	−0.009	−0.020	−0.017
	(0.010)	(0.041)	(0.015)	(0.016)	(0.016)	(0.012)
Bought >5 years	−0.018	−0.023	−0.007	0.007	−0.022	−0.008
	(0.011)	(0.042)	(0.021)	(0.019)	(0.016)	(0.014)
Risk aversion	−0.003*	0.013*	0.000	−0.003	−0.002	−0.003
	(0.002)	(0.007)	(0.003)	(0.003)	(0.003)	(0.002)
Nonrecourse state	0.007	0.035	−0.009	−0.004	−0.002	0.007
	(0.010)	(0.041)	(0.020)	(0.020)	(0.014)	(0.014)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,851	197	886	936	1,674	2,385

To obviate this problem, we try to directly model the measurement error. Suppose that the true relation between the decision to default and the norm of morality is

$$d^* = -am^* + \varepsilon,$$

where d^* and m^* are, respectively, the true answers to the default question (equal to one if the respondent is willing to default strategically) and the morality question (equal to one if strategic default is considered immoral), and ε is a "classical noise."

When the morality question is asked first, we observe morality without any nonclassical measurement error, but observe default with a systematic measurement error.[10] We assume that the observed answer to the default question is generated by

$$d = d^* - k_0 - k_1 m^*,$$

where d is the observed default answer that contains a measurement error. This measurement error consists of two parts: k_0, a classical error that induces an underestimate of default because respondents want to look good in the eyes of the interviewer, and k_1, the "consistency" bias. The idea is that, if the respondent has answered that default is immoral ($m^* = 1$), he feels more compelled to answer that he will not default to be consistent in his answers. This reduces the probability that $d = 0$ when $m^* = 1$.

In the presence of this measurement error, the estimated slope coefficient on the effect of morality on default will be

$$\frac{\text{cov}(d, m^*)}{\text{var}(m^*)} = \frac{\text{cov}(d^* - km^*, m^*)}{\text{var}(m^*)} = \frac{\text{cov}(d^*, m^*)}{\text{var}(m^*)} - k_1 = -(a + k_1).$$

If we had an estimate of k_1 we could correct the estimated slope coefficient to obtain the true coefficient a.

Taking the expectation of (2), we find that

$$k_1 = \frac{\bar{d}^* - \bar{d} - k_0}{\bar{m}^*}.$$

So if k_0 were zero, we could estimate k_1 by replacing $\bar{d}$ and $\bar{m}^*$ with their corresponding sample means in the subsample in which morality is asked first (so that default is measured with error and morality is not) and $\bar{d}^*$ with the sample mean answer to the default question in the subsample in which default is asked first and thus measured without any nonclassical measurement error. The estimate of that we obtain is 0.059.

[10] It is possible that the answers to the morality question are biased even when this question is asked first because people tend to overstate their moral standards to look good in the eyes of the interviewer. If this error is uncorrelated with respondents' answers to the default question, however, the effect of this measurement error will only bias the coefficient downward, underestimating the magnitude of the effect.

The above estimate is the true k_1 only under the assumption that k_0 is zero. To check whether this is a reasonable assumption we re-estimate k_1 by using a different sample where the interviewer effect is smaller. For this purpose we repeat the same interviews with the same randomization scheme on a sample of 1,088 individuals online, where the interviewer effect is known to be smaller (Mann and Stewart (2000)). The estimate of k_1 that we obtain is 0.018. The difference suggests that k_0 is positive. In fact, scaled by $\bar{m}^*$, the difference represents a lower bound of k_0 (it is the true k_0 only if the interviewer effect in the online survey is zero).

With this estimate of k_0, we can obtain the true k_1 and use equation (3) to eliminate the effect of measurement errors on our estimate of a. Since our correction method works only in a linear model, we start from a linear probability model (column 5) and we correct this estimate using equation (3). The corrected estimate is reported in column 7. To compute the coefficient standard error, we bootstrap this procedure 5,000 times and use the standard deviation of the estimated coefficients as our standard error. As column 7 shows, the corrected coefficient is positive, albeit 30% smaller than the uncorrected one, and statistically different from zero. A person who considers default immoral is 75% less likely to default.

Table III, Panel B repeats the same regression with the default question at \$100K of shortfall. The results are virtually identical.

C. Cross-Sectional Variation

As a further check on the validity of our sample responses, we split the sample between people who do not face the decision to default strategically (i.e., have positive home equity) and people who do face such a decision (i.e., have negative home equity). As previously stated, here we focus only on those respondents who declare owning a house. The survey asks these respondents for an estimate of the value of their house and of their mortgage. These questions allow us to split the sample on the basis of whether the respondent's perceived home equity is negative. The first two columns of Table III, Panel C represent the results.[11] By comparing column 2 with column 1, we see that morality is

[11] One possible concern regarding this split is the limited number of people who declare being underwater. This is due in part to the fact that only two-thirds of the respondents know what the value of their mortgage is. Furthermore, only 50% of the respondents declare having a positive mortgage. To ensure that our numbers are reasonable, we compare them with CoreLogic data. In the United States, one-third of households has no mortgage. If we assume that people who do not have a mortgage know it (and thus do not answer "I do not know"), the two percentages are very similar. In addition, in our data the percentage of people who declare having negative equity is 11% and varies from 9% (March 2009) to 16% (December 2009). This figure is below CoreLogic's estimate, which in the same period varies from 21% to 35%. CoreLogic's estimates rely on housing prices based on actual sales (which include distressed sales). Our estimates, in contrast, are based on the self-assessed value of the house. This amount can differ from that computed by CoreLogic in two ways. First, the homeowner will correctly estimate that if he sells he will sell at a price higher than the price of an identical house that has been foreclosed. Second, owners are affected by the loss aversion documented by Genesove and Mayer (2001). They find that owners subject to nominal

much more relevant when the option to walk away is in the money. This result is inconsistent with the hypothesis that the effect of morality is present only when the question is hypothetical. We further see that the probability of becoming unemployed does not affect the decision to default among people who have negative equity. This is consistent with the results of the Amherst Securities Group mentioned earlier. Interestingly, in this subsample risk aversion increases rather than decreases the probability of walking away. This is not so surprising. Once one's house is underwater, not defaulting is a risky gamble: the homeowner pays a cost (the monthly mortgage) in the hope that the house's value recovers.

In columns 3 to 6, we repeat the split using different criteria: positive and negative equity based either on the median negative equity in the metropolitan area based on Zillow.com or on the decrease in housing prices in the state based on the Federal Housing Finance Agency (FHFA) Index. The results are similar, albeit less stark, given that these are noisy proxies of a respondent's actual home equity value.

In wave 8, we add the question "Would you feel morally less obligated to repay your mortgage if you knew that . . . (1) your broker sold the mortgage in the market? (2) your mortgage is being held by a bank that was helped by the government? (3) your mortgage is being held by a bank that has been accused of predatory lending? By predatory lending, we mean the practice of imposing unfair and abusive loan terms on borrowers." The three different endings were randomized in the sample, so that one-third of the sample responded to each one of them. As Table I, Panel A shows, 39% of respondents feel less morally obligated to pay if the mortgage has been sold in the marketplace, 28% if the bank has been helped by the government, and 44% if the bank engaged in predatory lending.

In Table IV we report probit regression results for these three subsamples; where the dependent variable is equal to one if the response is yes, they feel less morally obligated to repay the mortgage. As we can see, people who think that it is morally wrong not to repay a mortgage are less likely to answer yes to the first two equations, but not to the third one. As reviewed by Galinsky and Gino (2010), moral disengagement (i.e., portraying unethical behavior as serving a moral purpose or dehumanizing victims of unethical behavior) is a typical predictor of immoral behavior. Hence, the moral constraint drops when the other side behaved immorally too.

D. The Role of Anger and Other Emotions

As a proxy for a feeling of unfairness, we use several questions asked in the Financial Trust Index Survey. First we look at the level of anger regarding

losses (like those we consider) set higher asking prices of 25% to 35% of the difference between the property's expected selling price and their original purchase price. If we adjust the self-assessed house value downward by 20% (consistent with the size of the bias estimated by Genesove and Mayer (2001)), we find that the percentage of underwater mortgages is 23%.

Table IV
Change in Morality

The dependent variable is a dummy equal to one if the homeowner says he would feel less morally obligated to repay the mortgage if a particular situation occurs (the broker has sold the mortgage, the bank has received money from the government, the bank was accused of predatory lending). All other variables are as defined in the Internet Appendix. These data are collected starting only from the eighth wave. One of the three situations is randomly assigned to the individual. The reported coefficients are marginal effects estimated with a probit model and computed at the mean of the independent variables. All regressions contain a constant term (not reported) and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

	Broker Who Sells (1)	Bank Helped (2)	Predatory (3)
Morally wrong to walk away	−0.325**	−0.326**	−0.022
	(0.131)	(0.155)	(0.118)
Shortfall% house	−0.303*	−0.157	0.076
	(0.182)	(0.129)	(0.192)
House price expectation	0.046	0.108***	0.101*
	(0.050)	(0.040)	(0.059)
Probability become unemployed	−0.257	0.198	0.037
	(0.205)	(0.140)	(0.205)
Income ($100K)	−0.266	−0.684***	−0.145
	(0.184)	(0.216)	(0.191)
Bought >5 years	0.228***	−0.078	−0.239*
	(0.085)	(0.125)	(0.133)
Risk aversion	0.032*	0.021	0.005
	(0.018)	(0.016)	(0.022)
Nonrecourse state	−0.175*	0.132	0.166
	(0.100)	(0.100)	(0.127)
Other controls	Yes	Yes	Yes
Observations	136	147	127

the current economic situation. As Table V shows, the angrier a person is, the more willing the individual is to default strategically: a one standard deviation increase in the level of anger increases the probability of default by 18%. Similarly, the higher the level of trust toward banks, the lower the probability of a strategic default: a one standard deviation increase in the level of trust decreases the probability of default by 17%. These effects are robust to controlling for the answer to the morality question.[12]

Di Tella and MacCulloch (2009) show that the demand for government intervention increases with the perception of corruption and unfairness. Therefore, we also use people's attitude toward regulation as a measure of their sense of unfairness. As expected, the probability of defaulting strategically is positively related to the demand for regulation: people who think that the government should cap executive compensation are 31% more likely than average to

[12] The trust question is asked before the default question, while the anger and regulations questions are asked after.

Table V

Anger, Trust, and Strategic Defaults

The dependent variable is a dummy equal to one if the homeowner says he is willing to default when the value of his home equity equals \$50K (in Panel A) or \$100K (in Panel B) even if he can afford to pay the monthly mortgage costs. All other variables are as defined in the Internet Appendix. The reported coefficients are marginal effects estimated with a probit model and computed at the mean of the independent variables. All regressions contain a constant term (not reported) and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

Panel A: Walk away at \$50K

	(1)	(2)	(3)	(4)
Angry about the economic situation	0.012***			
	(0.003)			
Trust banks		−0.013***		
		(0.003)		
Government should impose cap on on executive compensation			0.028***	
			(0.009)	
Government should regulate financial sector more				0.025***
				(0.009)
Morally wrong to walk away	−0.099***	−0.095***	−0.097***	−0.093***
	(0.015)	(0.014)	(0.016)	(0.017)
Shortfall% house	0.081***	0.079***	0.078***	0.072***
	(0.012)	(0.012)	(0.013)	(0.014)
House price expectation	0.000	0.001	−0.001	−0.002
	(0.005)	(0.005)	(0.005)	(0.005)
Probability become unemployed	0.038**	0.039***	0.032**	0.025
	(0.015)	(0.015)	(0.016)	(0.017)
Income (\$100K)	−0.016*	−0.019**	−0.019*	−0.021*
	(0.010)	(0.010)	(0.010)	(0.011)
Bought >5 years	−0.017	−0.016	−0.015	−0.024*
	(0.010)	(0.010)	(0.011)	(0.013)
Risk aversion	−0.003*	−0.003**	−0.002	−0.003
	(0.002)	(0.002)	(0.002)	(0.002)
Nonrecourse state	0.007	0.005	0.005	0.008
	(0.010)	(0.010)	(0.011)	(0.012)
Other controls	Yes	Yes	Yes	Yes
Observations	4,039	4,034	3,375	2,958

Panel B: Walk away at \$100K

	(1)	(2)	(3)	(4)
Angry about the economic situation	0.019***			
	(0.005)			
Trust banks		−0.016***		
		(0.006)		
Government should impose cap on executive compensation			0.073***	
			(0.015)	

(*Continued*)

Table V—*Continued*

Panel B: Walk away at $100K				
	(1)	(2)	(3)	(4)
Government should regulate financial sector more				0.066***
				(0.016)
Morally wrong to walk away	−0.200***	−0.199***	−0.201***	−0.190***
	(0.021)	(0.021)	(0.022)	(0.024)
Shortfall% house	0.169***	0.166***	0.153***	0.149***
	(0.024)	(0.024)	(0.025)	(0.027)
House price expectation	−0.003	−0.001	−0.009	−0.009
	(0.008)	(0.008)	(0.008)	(0.009)
Probability become unemployed	0.066**	0.065**	0.051*	0.050*
	(0.026)	(0.026)	(0.028)	(0.029)
Income ($100K)	−0.070***	−0.075***	−0.081***	−0.087***
	(0.015)	(0.015)	(0.016)	(0.017)
Bought >5 years	−0.026	−0.023	−0.023	−0.020
	(0.017)	(0.017)	(0.019)	(0.020)
Risk aversion	−0.002	−0.003	−0.001	−0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Nonrecourse state	0.008	0.009	0.018	0.028
	(0.017)	(0.017)	(0.018)	(0.020)
Observations	3,871	3,868	3,234	2,846

default strategically, and people who think that the financial sector should be regulated more are 28% more likely than average to default strategically.

Taken together, these results are consistent with the view that the decision to default is based not just on economic considerations, but also on ideological or emotional ones.

E. Social Contagion

An important question is whether there is any risk of social contagion in strategic defaults. Social contagion can arise because people learn from each other or because the social stigma associated with an action that is considered immoral decreases with the number of people doing it.

To answer this question, in the basic regression in Table VI, Panel A we include a dummy variable equal to one if the respondent knows somebody who has defaulted strategically. Knowing somebody who defaulted strategically increases the probability that a homeowner declares that s/he is willing to default strategically by 51% (column 1). This effect is not due to the clustering of default-prone individuals in certain areas since the effect is unchanged if we control for the percentage of foreclosures in the same zip code (column 2). Further, the effect does not arise just from knowing somebody who defaulted, but rather from knowing somebody who defaulted strategically, as column 3 shows including a dummy variable equal to one if the respondent knows somebody

Table VI

Defaults and Information about Other Defaulters

The dependent variable is a dummy equal to one if the homeowner says he is willing to default when the value of his home equity equals $50K (in Panel A) or $100K (in Panel B) even if he can afford to pay the monthly mortgage costs. All other variables are as defined in the Internet Appendix. The reported coefficients are marginal effects estimated with a probit model and computed at the mean of the independent variables. All regressions contain a constant term (not reported) and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

Panel A: Walk away at $50K

	(1)	(2)	(3)	(4)	(5)
Know someone who strategically defaulted	0.045***	0.043***	0.041**		0.037**
	(0.013)	(0.013)	(0.017)		(0.017)
Percentage of foreclosures in the area		0.163***		0.158***	0.162***
		(0.060)		(0.060)	(0.060)
Know someone who defaulted			0.004	0.021**	0.006
			(0.011)	(0.009)	(0.011)
Morally wrong to walk away	−0.099***	−0.086***	−0.100***	−0.090***	−0.086***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Angry about the economic situation	0.011***	0.013***	0.010***	0.014***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Shortfall% house	0.082***	0.082***	0.082***	0.083***	0.082***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
House price expectation	0.002	0.003	0.002	0.003	0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Probability become unemployed	0.040***	0.043***	0.039***	0.041***	0.042***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Income ($100K)	−0.018*	−0.015	−0.018*	−0.013	−0.015
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Bought>5 years	−0.019*	−0.020*	−0.019*	−0.019*	−0.020*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Risk aversion	−0.003	−0.001	−0.003	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Nonrecourse state	0.004	0.003	0.004	0.004	0.003
	(0.010)	(0.011)	(0.010)	(0.011)	(0.011)
Other controls	Yes	Yes	Yes	Yes	Yes
Observations	3,847	3,459	3,847	3,541	3,459

Panel B: Walk away at $100K

	(1)	(2)	(3)	(4)	(5)
Know someone who strategically defaulted	0.035*	0.032	0.033		0.027
	(0.020)	(0.020)	(0.025)		(0.025)
Percentage of foreclosures in the area		0.195*		0.187*	0.194*
		(0.115)		(0.112)	(0.115)
Know someone who defaulted			0.002	0.018	0.007
			(0.019)	(0.015)	(0.019)
Morally wrong to walk away	−0.199***	−0.193***	−0.199***	−0.199***	−0.193***
	(0.021)	(0.022)	(0.021)	(0.022)	(0.022)

(*Continued*)

Table VI—*Continued*

Panel B: Walk away at $100K					
	(1)	(2)	(3)	(4)	(5)
Angry about the economic situation	0.018***	0.018***	0.018***	0.019***	0.018***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)
Shortfall% house	0.170***	0.161***	0.170***	0.162***	0.161***
	(0.025)	(0.027)	(0.025)	(0.027)	(0.027)
House price expectation	−0.000	0.002	−0.000	0.000	0.002
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Probability become unemployed	0.063**	0.063**	0.063**	0.065**	0.062**
	(0.027)	(0.028)	(0.027)	(0.028)	(0.028)
Income ($100K)	−0.069***	−0.063***	−0.069***	−0.065***	−0.063***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Bought>5 years	−0.030*	−0.039**	−0.030*	−0.035*	−0.039**
	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
Risk aversion	−0.002	−0.002	−0.002	−0.002	−0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Nonrecourse state	0.009	0.001	0.009	−0.002	0.001
	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
Other controls	Yes	Yes	Yes	Yes	Yes
Observations	3,691	3,321	3,691	3,399	3,321

who defaulted in general reduces the coefficient on the other dummy variable only marginally.

While the above controls reduce the likelihood that the observed effect is simply due to the clustering of default-prone individuals in the same areas, they do not eliminate it completely. To further address this issue, in an unreported regression we look at whether people who know other people who defaulted strategically or people who live in a ZIP Code with a higher number of foreclosures tend to have lower moral standards, that is, are less likely to respond that a strategic default is immoral. We do not find supportive evidence. In fact, the coefficient is positive and statistically significant in some specifications. Thus, there is no evidence that more default-prone individuals tend to cluster together.

The second strategy to address this problem is to look at default at different levels of shortfall. If the observed effect is due to clustering, we should observe a similar default pattern when the shortfall is $50K as when the shortfall is $100K. As Table VI, Panel B shows, this is not the case. Both knowledge of somebody who defaulted and the number of foreclosures in the same ZIP Code have no effect on the probability of default when the equity shortfall is $100K. This pattern is inconsistent with the clustering hypothesis, but is consistent with both the information and social stigma hypotheses. Social stigma can prevent strategic default when the cost is not too large, whereas when it is too large it becomes inframarginal. The same can be true about information regarding the cost of strategic default. If the benefit of strategic default is very large (as in the case of a $100K shortfall), the possible costs are inframarginal

and thus learning about them does not alter the decision. This explains why we find an effect in Table VI, Panel A but not in Table VI, Panel B.

The tests above are only indirect ways to address the question of what determines the social contagion in strategic defaults. However, thanks to a variable included in waves 6 to 8, we have a more direct way to discriminate between the various hypotheses. One implication of the information spillover hypothesis is that respondents who know somebody who defaulted strategically update their estimates of the cost of such a decision. A major determinant of these costs is the decision of a lender to sue. Talking with several legal experts we arrived at the conclusion that these suits are very rare. Nevertheless, the perception is different. On average, people think that the probability that a lender will go after a borrower is 53%. Hence, if knowing somebody who defaulted strategically leads to some learning, we should observe a reduction in the perceived probability that a lender goes after the borrower when the respondent knows somebody who defaulted strategically.

In Table VII, we regress this perception on several individual characteristics, whether a state is nonrecourse, and a dummy variable equal to one if the respondent knows somebody who has strategically defaulted. While the legal treatment of mortgages in the state does not impact the perceived probability, knowing someone who defaulted does. Knowing a strategic defaulter decreases the perceived probability a lender will go after a borrower by 8.8 percentage points. That nonstrategic default has a marginally significant effect on the perceived probability of a bank going after the borrower does not contradict the results in Table V, where it has no significant effect on the willingness to default strategically. Observing somebody defaulting provides information about both the subjective costs of defaulting (e.g., how painful it is for children to move) and the objective costs (how great the social stigma is and how likely a bank is to go after a borrower for the difference). While strategic defaults provide information about both aspects, nonstrategic defaults provide information mostly about the subjective costs (since lenders have fewer incentives to go after a borrower who is in financial distress). This explains why the effect of knowing somebody who defaulted strategically is much stronger than the effect of knowing somebody who defaulted nonstrategically, both in Table V and in Table VI.

In sum, the evidence is consistent with the information spillover hypothesis and inconsistent with the clustering hypothesis. We cannot rule out the possibility that there is also a social stigma effect, but (unlike for the information spillover hypothesis) we do not have any direct evidence to support it.

F. The Effect of the Media

White (2009) argues that emotional constraints restrain people from strategically defaulting and that "social control agents such as the government, the media, and the financial industry use both moral suasion and disinformation to cultivate these emotional constraints in homeowners." That even in nonrecourse states respondents think that lenders will come after borrowers with a

Table VII

Determinants of the Probability that Lenders Go after Defaulters

The dependent variable is the perceived probability that a lender would go after defaulters, measured on a scale between 0 and 100. The table reports beta coefficients from OLS regressions. All regressions contain dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

	Perceived Probability that the Lender Would Go after Defaulters		
	(1)	(2)	(3)
Know someone who strategically defaulted	−0.088***		−0.060**
	(0.021)		(0.026)
Know someone who defaulted		−0.065***	−0.039*
		(0.016)	(0.021)
Shortfall% house	0.013	0.015	0.014
	(0.029)	(0.029)	(0.029)
House price expectation	0.002	0.006	0.002
	(0.010)	(0.010)	(0.010)
Probability become unemployed	0.096***	0.093***	0.097***
	(0.032)	(0.032)	(0.032)
Income (100K dollars)	−0.044**	−0.037**	−0.043**
	(0.018)	(0.017)	(0.018)
Bought >5 years	0.013	0.009	0.013
	(0.020)	(0.020)	(0.020)
Risk aversion	−0.004	−0.003	−0.004
	(0.003)	(0.003)	(0.003)
Nonrecourse state	−0.011	−0.008	−0.010
	(0.019)	(0.019)	(0.019)
Constant	0.514***	0.492***	0.519***
	(0.063)	(0.064)	(0.063)
Other controls	Yes	Yes	Yes
Observations	1,852	1,890	1,852

50% probability seems consistent with this claim. To explore this hypothesis more directly, we use the last five waves of the survey that contain a measure of respondents' exposure to the media (average hours spent in a day reading or watching news).

In Table VIII we include this measure of media exposure in the basic specification. Contrary to White's (2009) claim, individuals more exposed to the media are more (not less) likely to default strategically (column 1). However, it is hard to interpret this coefficient as causal. People who choose to spend more time reading or watching news may differ on other dimensions, which we are unable to properly observe and control for.

To address this problem, we exploit time variation in the coverage that strategic default had on the main media. Figure 10 reports the number of articles containing the words "walking away" and "housing" appearing in Factiva from December 2008 to September 2010. As the figure shows, there has been an explosion of coverage since the beginning of 2010. Searches of similar words

Table VIII

The Role of the Media in Explaining Strategic Defaults

The dependent variable is a dummy equal to one if the homeowner says he is willing to default when the value of his home equity equals $50K even if he can afford to pay the monthly mortgage costs. All other variables are as defined in the Internet Appendix. Since data on the media were collected starting with wave 4, estimates are based on waves 4 to 8. The reported coefficients are marginal effects estimated with a probit model and computed at the mean of the independent variables. All the regressions contain a constant term and dummies for waves. Robust standard errors are in parentheses. */**/*** indicates statistical significance at the 10% / 5% / 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Time spent reading/watching news during an average day (hours)	0.008*	0.034*	0.009*	0.038**	0.009**	0.038**
	(0.004)	(0.018)	(0.005)	(0.018)	(0.005)	(0.018)
Wave		0.003		0.005		0.007
		(0.006)		(0.006)		(0.006)
Time news*wave		−0.005		−0.005*		−0.005*
		(0.003)		(0.003)		(0.003)
Know someone who strategically defaulted			0.048***	0.049***	0.065***	0.065***
			(0.016)	(0.016)	(0.024)	(0.024)
Know someone who defaulted					−0.016	−0.016
					(0.015)	(0.015)
Percentage of foreclosures in the area			0.133	0.131	0.135	0.131
			(0.084)	(0.084)	(0.084)	(0.083)
Shortfall% house	0.077***	0.076***	0.075***	0.073***	0.075***	0.075***
	(0.016)	(0.016)	(0.018)	(0.018)	(0.018)	(0.018)
House price expectation	−0.005	−0.004	−0.004	−0.004	−0.005	−0.004
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Probability become unemployed	0.032	0.031	0.041**	0.040**	0.042**	0.042**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Income ($100K)	−0.003	−0.004	−0.011	−0.012	−0.011	−0.010
	(0.012)	(0.011)	(0.013)	(0.012)	(0.013)	(0.013)
Bought>5 years	−0.005	−0.006	−0.012	−0.012	−0.011	−0.011
	(0.014)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Risk aversion	−0.002	−0.002	−0.001	−0.001	−0.002	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Nonrecourse state	0.004	0.004	0.006	0.006	0.006	0.006
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,616	2,616	2,214	2,214	2,214	2,214

exhibit the same pattern. A likely explanation for this increase in coverage is the publication on January 7, 2010 of an article by Roger Lowenstein in the *New York Times Magazine*. As the title ("Walk Away from Your Mortgage!") suggests, this article, which also cites White (2009), looks very favorably on strategic defaults.

In column 2 we include a time trend for the September 2009, December 2010, and September 2010 waves, in which information on time spent reading or watching the news is available, and an interaction between exposure and the number of the wave. Contrary to White's (2009) hypothesis, when the media

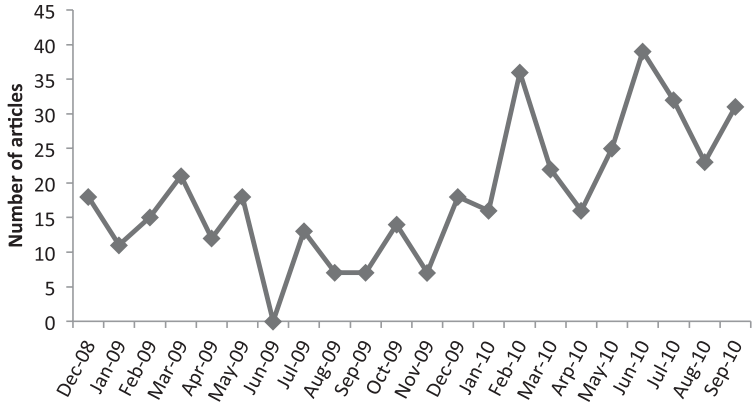


Figure 10. News coverage of strategic defaults over time. This figure shows the number of articles found by searching the Factiva database for the joint appearance of the words "walking away" and "strategic default."

talk more favorably about strategic default, people who are more exposed to the media are less likely to be willing to default strategically. This result can be interpreted as a decreasing marginal effect of time spent reading or watching news when it comes to learning about the costs and benefits of strategic default. When the media were talking very little about the subject, only people who spent a lot of time watching or reading news would learn more about the costs of defaulting. By contrast, after the media started to talk about this phenomenon at great length, even the most casual reader/watcher would learn about it, hence the decreased marginal effect.

V. What Explains the Increase in Strategic Default?

Figure 7 shows that the proportion of strategic defaults has significantly increased during 2009. What can account for this phenomenon?

As Figure 1 shows, the willingness to default has remained fairly stable over time. This stability is the result of an increase over time in the number of people who know somebody who defaulted strategically (Figure 5) and a reduction in the level of anger (Figure 4). The first change increases the willingness to default, while the second decreases it by roughly the same amount.

Since the propensity to default strategically is increasing in the size of the home equity shortfall (see Figure 2), a possible explanation is that the number of people with a home equity shortfall has increased during 2009. This conjecture is supported by Figure 11, which shows the percentage of households with negative equity from the third quarter of 2008 to the first quarter of 2010, as reported by Zillow.com. As Figure 11 shows, the big jump is between the third quarter of 2008 and the second quarter of 2009. The percentage seems to have stabilized between the second quarter of 2009 and the first quarter of 2010. If we look at the behavior of aggregate housing prices, however, these dropped at

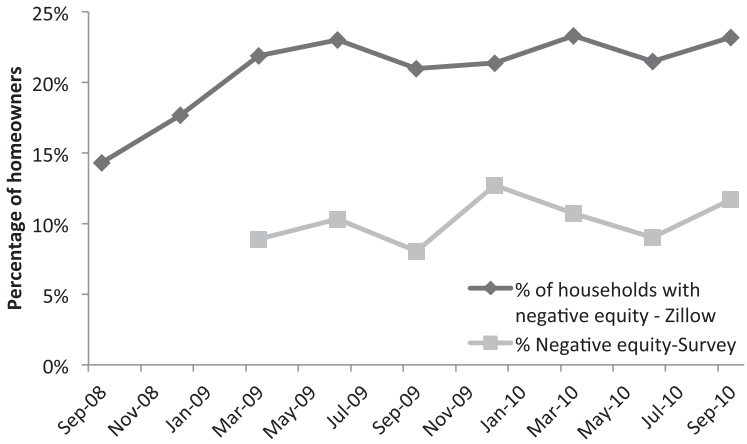


Figure 11. Percentage of households with negative equity. This figure shows the evolution of the percentage of U.S. homeowners with negative equity based on estimates from Zillow.com.

the national level over the entire period. How can we explain, then, the pattern in the percentage of people with negative equity?

In determining the percentage of people with negative equity (and the percentage of strategic defaults), what matters is not the *average* of housing prices, but rather the behavior of housing prices in the areas that have been hit the hardest in the past. It is irrelevant, for example, if housing prices dropped 5% from September 2009 to March 2010 in the Augusta (SC) metro area, since this is an area where in June 2009 only 2% of families had negative equity, while it is much more relevant that during the same period in the Stockton (CA) metro area prices increased slightly, since, according to Zillow.com, in that area 51% of households had negative equity in June 2009.

This distinction highlights the importance of understanding the nonlinearity in the relationship between housing prices and strategic default. What matters for strategic default is not the aggregate level of house prices, but the behavior in the areas worst hit.

VI. Conclusions

While it is unlikely that homeowners would walk away from their homes when their home equity is only slightly negative, very little is known about their willingness to walk away when their negative home equity position becomes large in absolute value. Our survey data try to shed light on the question.

Our findings suggest that the cost of defaulting strategically increases with wealth, albeit at a decreasing rate, and that it is driven by both pecuniary and nonpecuniary factors, such as views about fairness and morality. Even controlling for possible spurious effects due to the fact that the morality and default questions are asked in the same survey, we find that people who consider it immoral to default are less willing to default. We also find that people who are

angrier about the economic situation, who trust banks less, and who want to see increased banking regulation are more likely to default strategically.

Finally, we find some social contagion in the decision to default strategically: people who know somebody who defaulted strategically are more willing to do so themselves. This effect does not seem to be due to clustering of people with similar attitudes, but rather to learning about the actual cost of default. We find a similar learning effect from exposure to the media, an effect that is reduced when the media start to cover the topic more extensively. These contagion and information effects should be seriously considered in the design of any public policy regarding housing.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Appendix S1: Internet Appendix