Minimum Wages and Consumer Credit: Impacts on Access to Credit and Traditional and High-Cost Borrowing

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Abstract

Proponents of minimum wage legislation point to its potential to raise earnings and lift families out of poverty, while opponents argue that disemployment effects lead to net welfare losses. But these arguments typically ignore the possibility that minimum wage policy has spillover effects on other aspects of households' financial circumstances. This paper examines how state-level minimum wage changes affect the decisions of lenders and low-income borrowers. Using data derived from direct mailings of credit offers, debt recorded in credit reports, and survey-reported usage of alternative credit products, we broadly find that when minimum wages rise, access to credit expands for lower-income households, who in turn, use more traditional credit and less high-cost alternatives. Specifically, for each $1 increase in the minimum wage, lower-income households receive 7 percent more credit card offers, with higher limits and improved terms. Further, there is a drop in usage of high-cost borrowing: payday borrowing falls 40 percent. Finally, we find that borrowers are also better able to manage their debt: delinquency rates fall by 5 percent. Overall, our results suggest that minimum wage policy has positive spillover effects by relaxing borrowing constraints among lower income households.

Keywords: consumer debt, minimum wages, credit limit, delinquency, payday loans, credit constraints

1. Introduction

Minimum wages policies are enacted to raise incomes for low skill workers, with the intended goal of lifting households out of poverty, reducing inequality, and stimulating the economy by increasing aggregate consumption. But labor market outcomes are only one piece of a household's finances, and any changes in income stemming from changes in the minimum wage may also affect a household's ability to borrow and their interactions with credit markets. Whether and how the minimum wage passes through to credit markets may weaken or amplify the effects of the policy. If low-income households face binding borrowing constraints, expanded access to credit could enable households to leverage small increases in income to finance lumpy durable or human capital investments, which could help further lift them out of poverty. But if potential borrowers are sufficiently present-biased, financially illiterate or face self-control problems, over-borrowing and large debt-service burdens could worsen household's financial circumstances, mitigating any income gains. If low-income households do not face binding borrowing constraints, or if lenders do not expand access to credit after a minimum wage change, than neither of these would occur.

Our paper examines the impacts of state-level minimum wage changes on lender and borrower behavior in traditional credit markets, like credit cards and auto loans, as well as high-cost alternative credit products, like payday loans. We use data on direct mailings of credit offers, panel data derived from credit reports, and survey data on high-cost credit usage, combined with changes in state minimum wage policy, to document several novel empirical facts. First, that lenders send more offers, with better terms, to low-income borrowers when the minimum wage rises in their state. Second, we confirm the findings from previous research

(e.g., Aaronson, Agarwal and French 2012): borrowing increases among low skill workers after the minimum wage rises, and that borrowers do not default on these new loans in the medium term. We also find evidence of pay-down of existing debts. As a result, borrowers' credit scores rise. And third, we document a substantial drop in usage of payday loans and other high-cost alternative to formal credit. We find no corresponding changes among higher income or higher skill workers.

We interpret our empirical results as supportive of the existence of borrowing constraints among low-income households. In particular, the fact that lenders increase access to traditional credit to low-income borrowers, and borrowers take up such low-cost credit and substitute away from payday borrowing after a minimum wage hike, suggests that credit constraints faced by low-income borrowers are at least partially relaxed when minimum wages increase. This view is consistent with recent work by Aaronson, Agarwal and French (2012) who found that their estimated consumption response to minimum wage hikes are consistent with a buffer stock model with widespread borrowing constraints. We expand upon their analyses by empirically documenting an expansion in credit supply and a reduction in payday borrowing.

We find that defaults fall by 5 percent following a minimum wage hike. For new borrowers, the reduction in defaults suggests these households are not over-borrowing, and for existing borrowers, it suggests households save some of their new income via debt pay-down. As a result, we find that credit scores rise by 8 points following a minimum wage change. Because payment behavior and credit scores are used in future credit applications, this suggests the minimum wage could have persistent effects on household's ability to access affordable liquidity. These changes may better enable those households' to weather future expenditure

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shocks and finance lumpy investments, further improving their economic well-being. To our knowledge, this potentially important --and persistent-- spillover effect of minimum wage policies on households' financial lives has not previously been explored.

We find evidence of a 40 percent drop in payday and other high-cost borrowing following minimum wage hikes. This is particularly notable in light of the fact that targeted payday loan bans have had limited success in reducing borrowing costs for low-income families (Bhutta, Goldin, and Homonoff, forthcoming). A common explanation for payday loan usage among low-income borrowers is cognitive biases (Bertrand and Morse, 2011). Our paper suggests borrowing constraints in traditional credit markets are an important explanation, and that policies that target income support and/or credit constraints may be more effective in reducing usage of these products than targeted bans.

Broadly, our paper indicates social insurance programs can have spillover effects on lender and borrower behavior in consumer credit markets, and these spillovers can amplify the effects of policy. This is consistent with Hsu, Matsa and Meltzer (2014) who find that more generous unemployment insurance acts as housing market stabilizer by averting mortgage default and foreclosures. Minimum wages target a lower income segment of the population, but we similarly see amplification effects via expanded access to lower cost credit. This speaks the potential interaction between social policy and financial stability.

The rest of the paper is organized as follows. Section II describes our conceptual framework for understanding how minimum wages affects how low-income households interact with credit markets, along with the relevant literature. Section III presents our empirical analysis, including a description of minimum wages in the US, our data and empirical strategy, and

results. We begin with an analysis of credit offers, then proceed to borrowing, payment behavior, and credit scores using credit bureau data; and then usage of alternative financial service credit products like payday loans in survey data. In Section IV, we take stock of all of our results and discuss their implications.

2. Conceptual Framework and Related Literature

There is a vast empirical literature in economics devoted to understanding the effects of minimum wage policy on labor market outcomes of affected workers.[2] A key fact emerging from this literature is evidence of positive earnings effects for a substantial majority of adult minimum wage workers following a minimum wage increase (for a review of the literature, see, for example, Belman and Wolfson, 2014). We expect minimum wages to affect households' interactions with credit markets via their effects on household income.

The first empirical paper to establish a link between minimum wage policy and borrowing behavior was Aaronson, Agarwal and French (2012). They document a rise in consumption that is nearly three times the associated rise in income following minimum wage hikes. Using panel data on borrowing, they find that the excess consumption is financed by increases in credit card, auto and home equity debt. Our analyses find a similar increase in borrowing following minimum wage hikes.

One plausible explanation for the increase in borrowing following minimum wage hikes is that minimum wage policy leads to an expansion in the supply of credit to low-income

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[2] The important contributions to this literature are too numerous to adequately review here. Excellent literature reviews include Card and Krueger (1995), Neumark and Wascher (2008), and Belman and Wolfson (2014).

borrowers. All things equal, lenders are generally willing to extend more credit, and at cheaper

terms, to households with higher ability to pay. And lenders may respond to the policy itself,

rather than any real changes in income for specific potential borrowers, if lenders expect positive

impacts of minimum wage policy on certain borrower-types. If minimum wage workers were

otherwise borrowing constrained, this increase in credit supply can lead to more borrowing,

particularly for those with few liquid assets who may have deferred expenditures. Indeed, limited

liquid assets and credit constraints are salient features of this population: data from the 2001-

2013 Survey of Consumer Finances (SCF) indicate nearly 40 percent of households with

minimum wage workers are credit constrained, and the median minimum wage worker holds

fewer than two thousand dollars in liquid assets – a tenth of the amount held by the median U.S.

household.[3]

Households who are unable to borrow in traditional credit markets can often still access

credit through higher-cost alternative financial service (AFS) credit products, such as payday

loans, "buy here pay here" auto loans, pawn shop loans, and "rent-to-own" furniture

agreements.[4] Payday loans and other AFS credit products are offered with minimal underwriting

(typically only proof of income or employment is required) and are characterized by very high

effective interest rates. If minimum wage borrowers use these products because they face

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[3] Authors' calculations. We identify minimum wage workers as those with wage income between 60 and 120 percent of the annualized equivalent of state minimum wage for a full time worker. Credit constraints are captured via a positive to response to either (1) being turned down for credit or (2) not applying for credit for fear of being turned down. Liquid assets include checking accounts, saving accounts and other financial assets, and do not include homes or vehicles.

[4] Some states ban payday lending in the period we study. However, Bhutta et al (2016) find these policies lead borrowers to use alternative AFS credit products, rather than discontinuing borrowing or using traditional credit.

borrowing constraints in traditional credit markets, an increase in the supply of traditional credit could lead to substitution away from high-cost alternatives to formal credit.[5]

In addition to possibly facing barriers to borrowing in traditional markets, behavioral biases might be another possible reason low-income borrowers might utilize AFS borrowing. If borrowers use AFS products because of financial illiteracy (Bertrand and Morse, 2011; Lusardi and de Bassa Scheresberg, 2013), we would not expect substitution away from AFS products when borrowing constraints are relaxed. Or, if borrowers are sufficiently present-biased, or have forecasting problems (e.g., Laibson, 1997), the relaxation of credit constraints in traditional credit markets could be a complement to AFS borrowing. This could lead to a rise in defaults in the near or long term, as borrowers are unable to service their new debt obligations.

For low-income workers who do not need additional credit, increases in the minimum wage might reduce borrowing and defaults among borrowers with existing traditional or AFS debt, if borrowers are in need of less debt-financed liquidity and/or choose to save new income via debt pay-down. Hsu, Matsa and Meltzer (2014) find that unemployed borrowers use unemployment insurance income to avert mortgage default. Similarly, Agarwal, Liu, and Souleles (2007) and Sahm, Shapiro, and Slemrod (2010) find evidence that borrowers use tax rebates to pay down debts. However, these are all temporary changes in income, while minimum wage hikes are permanent.

Finally, we acknowledge that throughout this discussion we have assumed that income rises following a minimum wage increase. While useful for simplifying the exposition, our analysis

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[5] If this substitution were dollar-for-dollar, this would not generate a change in consumption, which would be inconsistent with the clear increase in consumption found by Aaronson, Agarwal, and French (2012).

does not require this to be the case; some studies have indeed estimated negative employment responses to increases in the minimum wage.[6] If there are disemployment effects, than income may fall for some workers, and our predictions for the impacts on credit markets would generally work in the reverse for those workers. Ultimately, the overall impact of minimum wages on credit markets is an empirical question that we seek to answer. In our analyses that follow, we relax the assumption that income effects are positive and estimate reduced form effects of minimum wages on credit market outcomes.

3. Empirical Analyses

3.1   Minimum Wages

Minimum wage legislation in the United States has a long history, dating back to the early 1900s. While originally adopted by states, the first federal minimum wage was enacted in 1938 with the Fair Labor Standards Act (FLSA). Since then, the federal minimum wage has grown periodically (though not always at pace with inflation), and various states have adopted minimum wages above the federal level. In this paper, we use monthly state-level minimum wage data from Neumark, Salas and Wascher (2014), which we update through 2015 using Economic Policy Institute's Minimum Wage Tracker.[7]   Table 1 highlights the various state-level changes in the minimum wage during the time period we study in this paper, 1999-2015. There is considerable cross-sectional variation in the minimum wage across states and over time during

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[6] See, for example, Neumark and Wascher (2008) for a review.

[7] The Minimum Wage Tracker can be accessed online at http://www.epi.org/minimum-wage-tracker/.

this period, ranging from $5.15 to $10.50. The most recent change in the federal minimum wage became effective July 2009, increasing from $6.55 to $7.25.

3.2   Credit Offers

3.2.1 Data and Empirical Specification

For our first set of analyses, we use information on traditional credit offers from direct mail advertising data from 1999 to 2015 compiled by Mintel Comperemedia. Mintel collects data from a sample of about 1,000 households each month, surveying household demographic and income characteristics in addition to compiling information from all mail-based credit and sales advertising, including credit card, mortgage, auto, student loan, and unsecured loan offers received by the household during the month. The data also include the terms of credit for credit card and mortgage offers, including interest rates, credit limits and whether a credit card offers rewards and has an annual fee. Our main analyses will focus on offers for products which are typically underwritten using income, that is, credit cards, auto loans, unsecured loans, and mortgages. We will also examine the credit limits and interest rates on credit card offers, the most popular type of mailing in the data. Table 2 summarizes minimum wage households in the Mintel data.

Importantly, the Mintel data include a measure of household income, household size, and the state of residence, which allows us to identify minimum wage households. To be precise, we identify minimum wage households as those whose household income is between 60 and 120 percent of the state minimum wage (for a single-person household) or 120 and 240 percent of the state minimum wage (for a multiple-person household), similar to Aaronson et al (2012).

We estimate ordinary least squares regressions of the following form:

$$y_{ist} = \beta_1 \ln(minwage_{s,t-3}) * minwagehousehold_{it}$$

$$+ \beta_2 \ln(minwage_{s,t-3}) + \beta_3 minwagehousehold_{it} + X_{it} + unemp\ rate_{st} + \gamma_s$$

$$+ \gamma_m + \varepsilon_{it}$$

Where y_{ist} is the credit offer outcome of interest for household *i* in state *s* in month *t.*

$\ln(minwage_{s,t-3})$ is the minimum wage in state *s* in month *t-3* (one quarter prior).[8]

$minwagehousehold_{it}$ is the indicator for whether or not the household is identified to have a

minimum wage worker. X_{it} is vector of demographic characteristics of the household

(education, race/ethnicity, and age group), γ_s is a vector of state fixed effects, γ_m is are a vector

of month fixed effects.[9] Standard errors are adjusted for clustering at the state level.

In these regressions, the coefficient of interest is β_1 which captures the conditional effect

of changes in the state-level minimum wage on credit offers to minimum wage workers. This

coefficient describes how a change in the minimum wage affects the credit offers received by

households who are most likely to be affected by changes in policy because of their incomes. β_2

captures the conditional main effect of changes in state-level minimum wages on credit offers net

of minimum wage household status, all else held constant. We interpret this as the effect of

changes in minimum wages on households who are less likely to be affected by policy changes.

This coefficient will capture any changes in credit availability associated with minimum wage

policy that are not related to changes in specific households' (perceived) credit-worthiness or

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[8] We chose one quarter prior to be consistent with the timing in the quarterly credit report data. Appendix table 11 shows different lags (one month and one year) and results are similar. The appendix can be found at: www.umich.edu/~jwhsu/dettling_hsu_minwage_credit_appendix.pdf.
[9] In additional results in the appendix, we examine the robustness of our results to additional controls, including interactions between the state fixed effects and minimum wage household status, and state-month time trends and census division-year fixed effects, as suggested by Allegretto et al (2011) (appendix table 1). The results are virtually unchanged.

demand for liquidity, such as changes in the general economic environment. The level term $minwagehousehold_{it}$ captures the level correlation between minimum wage household status and credit offers. We include the main effect of minimum wage status to facilitate a causal interpretation of β_1, but do not assign a causal interpretation to the coefficient on the main effect since the level correlation between credit offers and borrower type could be determined by a host of different factors, such as average credit scores or whether the type of borrower is more likely to be a homeowner.

We are interested in identifying the causal relationship between state-level minimum wages and credit offers to minimum wage workers. As such, it is important that we control for time-varying state-level economic conditions that might affect credit offers. Thus, our analysis also include the state-month unemployment rate ($unemp\ rate_{st}$), drawn from the Bureau of Labor Statistics (BLS) local area unemployment statistics. Our analyses also importantly include state and month fixed effects (γ_s and γ_m), so that the estimate relationship between minimum wages and credit offers is not confounded by time-invariant differences in credit offers to states with higher or lower minimum wages or national trends in minimum wage levels and credit availability.

3.2.2 Results for Credit Offers

Table 3 presents the results of estimating equation (1) where the outcome is the number of offers received in each of the main loan types.[10] This specification yields a point estimate on the interaction term between minimum wage worker status and the natural log of minimum wage

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[10] The appendix includes specifications where the outcome is alternatively a binary indicator of any offer received or the conditional number of offers (appendix table 2), both of which provide similar results.

(β_1) of 1.8334 for credit cards, 0.0001 for auto loans, 0.1571 for other unsecured loans, and

0.0775 for mortgages. Of these, the results are statistically significant at the one percent level for

credit cards and unsecured loans.[11] This indicates that minimum wage workers receive more

credit offers of these types when minimum wages rise. At the mean, these estimates imply that a

$1 increase in the minimum wage leads to a 6.9 percent increase in credit card offers and an 11.2

percent increase in unsecured loan offers.

On the other hand, we see that the conditional main effect of the minimum wage is small

and imprecisely estimated for all types of loans, indicating that offers received by higher-income

households are unaffected by changes in the minimum wage. The coefficients on

$minwagehousehold_{it}$ indicate that, on average, low-income households receive fewer offers

than higher-income households for all types of loans except auto loans (where the results are

indistinguishable from zero), consistent with minimum wage households having relatively less

credit available to them. Note that the results in table 3 indicate that typical changes in the

minimum wage narrow, but do not erase this gap. For example, the average minimum wage

household receives 5.2 fewer credit card offers per month than higher income households, and

after the minimum wage rises by $1, minimum wage households would receive 4.95 fewer offers

per month. Extrapolating, our results imply that the minimum wage would need to almost

quadruple for minimum wage households to receive as many credit card offers as higher income

households. Overall, the evidence in table 3 is consistent with higher minimum wages increasing

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[11] One possible explanation for the lack of a result on either interaction of level term for auto loans is that these mailings are quite rare. Mortgage offers are less rare overall, but rare among minimum wage households who are less likely to be homeowners.

the offers received precisely for the group affected by the minimum wage, with no effects on other groups.

Table 4 narrows in on the terms included in credit card offers received, including the credit limit and interest rates. Columns 1 and 2 displays the results where the outcome is the mean and maximum credit limit, respectively. The coefficient on the interaction term indicates that minimum wage households receive higher credit limit credit card offers when minimum wages rise: a one hundred percent rise in the minimum wages raises the mean credit limit by $14,185, and the maximum credit limit by $35,123 for minimum wage households. At the mean, this implies that a $1 rise in the minimum wage increases credit limits offered to minimum wage households by 5.2 percent (mean limit) and 10.1 percent (maximum limit). The conditional main effect of the minimum wage indicates there is no corresponding effect for higher income workers, and the level terms indicate that minimum wage households, on average, are offered lower credit limits on credit card offers. Again, we find that a typical minimum wage increase narrows but does not erase gaps in credit limits offered to minimum wage and higher income households. Extrapolating, our results imply the minimum wage would need to triple in order for minimum wage households to receive as high of credit limits as higher income households.

Columns 3-4 of table 5 display results for interest rates. For comparability, we focus on cards that offer neither rewards nor annual fees, since interest rates often differ on these dimensions, and any changes in the mix of offers would complicate such an analysis.[12] Column 3 displays the results for the purchase APR and column 4 displays the results for the default APR.

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[12] The appendix includes results on the mix of offers received (appendix table 3) as well as interest rates on other types of cards (appendix table 4). Those results indicate that minimum wage workers do receive more of these types of offers when minimum wages rise.

Purchase APR is the standard APR offered on purchases. Default APR is the interest rate that is later applied in the event that the borrower misses any payments. Interestingly, we see that on average, lower income households are offered lower purchase APRs and higher default APRs. This is consistent with Ru and Schoar (2016), who find that credit card-issuers target less-sophisticated (less educated) customers with more steeply back-loaded fees (lower introductory and purchase interest rates, and higher default interest rates, late fees and over-limit fees). However, we see that when minimum wages rise, minimum wage households are offered slightly higher purchase APRs and lower default APRs, making their offers more similar to those received by higher income households. As in previous specifications, there is no effect of a change in minimum wages on higher income households.

Our preferred interpretation of these analyses is that they represent unsolicited credit offers, and as such, provide a unique opportunity for studying the availability of credit over time for the populations of interest. The evidence we find suggests minimum wage borrowers have more credit available to them once the minimum wage rises. An important question is the extent to which this is a one-to-one response to the change in income from a minimum wage hike –that is, a shift *along* the credit supply curve—or if it is larger than we might expect from the change in income –that is, a shift *outwards* in the credit supply curve. Figure 1 traces out the credit card offer curve by income bracket in 2005, where the blue line represents the mean number of credit card offers received by households in each income bracket who reside in states where the minimum wage is above the federal minimum wage, and the red line represents the mean number of offers to borrowers in states observing the federal minimum wage. This provides suggestive evidence that the effects we observe are consistent with a shift outwards in the supply curve in

response to policy: at each income level consistent with minimum wage work, households in states with higher minimum wages receive more offers.

An important caveat to these analyses is that not all forms of credit are advertised through the mail, and the data provide only a glimpse of the full range of credit products that may available to a person. For example, auto loan financing offers are rare in the data: the median (and even the 90th percentile) respondent receives no auto loan offers.[13] This suggests an analysis of credit offers by mail may *understate* the overall credit supply effects of minimum wage policy. At the same time, mail offers often include ranges, maximum borrowing limits, or minimum interest rates, which are dependent on further underwriting. This suggests our analyses might *overstate* the amount of credit households could actual receive. For these reasons, we will turn next to an investigation into household borrowing patterns, in order to gauge whether and how these offers translate into credit usage, and to more fully capture the full range credit products that may be available to a household.

3.3   Borrowing, Payment Behavior and Credit Scores

3.3.1 Data and Empirical Specification

Data on borrowing and payment behavior come from the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP/Equifax).[14] The CCP/Equifax is an individual-level panel dataset of consumer credit reports, obtained from one of the three main credit bureaus in the United States. The data have been collected four times per year (March, June, September and

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[13] Auto *sales* advertising is slightly more common in the data than auto *loan* advertising. It is worth noting that auto sales advertising frequently mentions financing options for "qualified borrowers," but since this tells us nothing about the availability of credit to the particular recipient, we limit our analyses specifically to auto loan offers.

[14] Additional information about the dataset, including sampling and methodology, can be found in Lee and van der Klaauw (2010) at www.newyorkfed.org/microecnomics/ccp.html.

December) since 1999 and consist of a five percent random sample of all U.S. consumers with

credit histories. The data include detailed information drawn from credit reports, such as loan

balances, credit limits, payment status, the Equifax risk score (a type of credit score).[15]

Our main outcomes of interest are measures of borrower usage of consumer credit and

payment behavior on auto loans, credit cards, and mortgages. We focus on two measures of

usage: the number of loans/trades in each category and credit limits on consumer credit cards.

For a picture of overall creditworthiness, we examine the borrower's credit risk, as captured by

the Equifax risk score, a type of credit score. This measure is a composite measure of

creditworthiness used by lenders in underwriting, and is determined by payment behavior, credit

utilization and length of credit history. We also examine overall payment behavior on any of the

three types of loans using an indicator for delinquency, defined as being 60 days or more past

due. We do not highlight analysis of debt balances themselves because balances in the

CCP/Equifax vary by type of debt in their meaning and interpretation. Credit cards, for example,

are recorded at an arbitrary point in the billing cycle and thus conflate credit card spending and

debt; borrowers who use cards for convenience only, paying off their bill in full every month,

and borrowers with large revolving balances are indistinguishable.

For this dataset, we estimate individual fixed effects models of the following form:

$$y_{ist} = \beta \ln(minwage_{s,t-k}) + age_{it} + unemp\ rate_{st} + X_{ct} + \gamma_s + \gamma_m + \gamma_i + \varepsilon_{it}$$

Where y_{ist} is the credit outcome of interest for individual *i* in state *s* in month *t*.

$\ln(minwage_{s,t-k})$ is the minimum wage in state *s* in month *t-k*, where *k=3* (one quarter prior) or

$k=12$ (one year prior). age_{it} is vector of dummies for the age group of person i, X_{ct} is a vector of Census-block/block-group characteristics (education, race/ethnicity, sex and median income), γ_s is a vector of state fixed effects, γ_m is a vector of month fixed effects, and γ_i is a vector of person fixed effects. We include person fixed effects so that we can interpret β as the effect of within-person changes in the minimum wage on within-person changes in our outcomes, net of any fixed characteristics of the borrower (such as their level of education or race/ethnicity, which are not observed in the data). Standard errors are adjusted for clustering at the person-level to allow for the panel structure of the data.

The CCP/Equifax has very rich debt information, but limited demographic characteristics; only the individual's age and location of residence are available.[16] To overcome this limitation, we proxy for the demographic characteristics of the sample member by merging to the data the demographic and economic characteristics of the individual's census block of residence (X_{ct}), tabulated from the 2000 Census. We use variables on the race, ethnicity, sex, median income (by age group) and educational attainment of the census block/block-group's inhabitants as control variables in our analyses.

Because the CCP/Equifax does not have borrower income, we cannot directly observe whether an individual's income is consistent with working in a minimum wage job as we can in the Mintel and SCF data. Instead, we focus our analyses on borrowers who live in a census-block group with a relatively high fraction of low-skill workers, defined as more than 50 percent of the

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[16] Federal law prohibits lenders from discriminating applications on the basis of race, ethnicity, marital status, national origin, religion, or receipt of public assistance, and these demographic characteristics are not included in the data.

census-block having below a high school education.[17] We interpret this as indicative that the borrower himself is, with high probability, a low-skill worker, and more generally, that he lives in a neighborhood where the cost-of-living is feasible for a low-skill (and typically lower income) borrower. Because this prediction will necessarily be imperfect, these analyses are akin to an "intent to treat" analysis, and the results are likely a lower bound on the causal effect for minimum-wage workers. That said, there is empirical evidence that changes in minimum wages also affect workers who make above-minimum wage incomes due to spillover effects.[18] As such, even if our data allowed us to focus exclusively on minimum wage workers, such an analysis could miss out on important effects for borrowers with slightly higher incomes, who likely also live in the types of neighborhoods minimum wage borrowers live. Table 5 describes the CCP/Equifax data for these borrowers.

3.3.2 Results for Borrowing, Payment Behavior and Credit Scores

Table 6 presents results estimating equation (2), where in columns 1-3 the outcome is the number of trades/loans the borrower has in each of the following categories: credit cards, auto loans, and mortgages. The results presented in table 6 columns 1-3 indicate that a one hundred percent change in the minimum wage leads to: 0.103 more credit cards and 0.043 more auto loans, both of which are statistically significant at the one percent level.[19] At the mean, these

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[17] Appendix figure 1 plots the regional representation of these types of Census Blocks, indicating they are diverse and represent all parts of the country. Appendix tables 5-7 also presents results using alternative cut-offs and different measures, including block-group median incomes, high school graduates and younger borrowers.

[18] See Belman and Wolfson (2014) for a review of literature on who is afftected by minimum wages.

[19] Aaronson et al (2015) also find that increase in the minimum wage lead to more auto debt.

effects imply that a $1 increase in the minimum wage leads to a 0.8 percent more credit cards and 1.5 percent more auto loans.[20]

Column 4-5 of table 6 displays credit limits on credit cards, defined as both the total limit across all credit cards and the average limit per card. Both indicate an increase in credit card limits, with a $2,366 increase in total credit available and a $496 increase in credit available per card. Evaluated at the mean, these coefficients imply that a $1 increase in the minimum wage increases credit limits on consumer credit cards by 1.4 percent per card, and 2.2 percent overall, which is about a quarter the size of the effects found for offers above.

The top panel of table 7 presents the results of estimating equation (2) where the dependent variables measure a borrower's payment behavior, including overall credit risk and delinquency.[21] Column 1 displays the results for credit scores, indicating a one hundred percent increase in the minimum wage leads to an 8 point increase in credit scores; at the mean, this implies a $1 increase in the minimum wage increase credit scores by 0.17 percent. Credit scores are heavily influenced by payment behavior, and indeed, column 2, which displays results for delinquency on any account, indicates a one hundred percent increase in minimum wages reduces the probability of being delinquent by 5.37 percentage points. At the mean, this indicates that a $1 increase in the minimum wage reduces delinquency rates by 5 percent. Taken together, these results imply increases in minimum wages lead to increased debt service payments, and improved credit scores, among households in lower-skill Census blocks.

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[20] Note that appendix table 5 indicates the auto loan result is sensitive to the particular subset of census blocks included in the analysis. Thus, we exercise caution in our interpretation of that result. The credit card result is quite robust on the other hand.

[21] Results in appendix table 9 also present results for the fraction of total balances by type which are current or past due. Results are very similar.

Columns 3-5 of the top panel of table 7 displays results for delinquency by type of debt. This indicates that the decline in delinquency can be attributed to changes in delinquency on credit cards, where a one hundred percent increase in minimum wages reduces the probability of being delinquent by 8.31 percentage points. At the mean, this implies that a $1 increase in minimum wages reduces credit card delinquency by 7.2 percent. The fact that the reduction in overall delinquency is driven by credit cards is not surprising; becoming current on a credit card only requires that the borrower make the minimum payment, typically around 2-4 percent of the total balance during this time period. Aaronson et al (2012) found that a $1 minimum wage hike increases household income by about $250 per quarter, which would cover the $90 minimum monthly credit card payment required for borrowers found in our sample (on average).

Since we are interested both in immediate reactions to a change in the minimum wage, as well as whether borrowers who take out new loans are able to manage this new debt, we will next focus our attention on what we call "medium run" outcomes, that is, payment behavior one year after a change in the minimum wage. We will look separately at borrowers who took out any new debt in the past year in each category (as well as overall) and those who did not, in order to directly examine whether borrowers with new debt after the minimum wage change were able to manage it over the next year.

The bottom two panels of table 7 presents results from estimating equation (2), where the independent variable of interest is one-year lagged minimum wages. The middle panel of table 7 displays results for borrowers without any new trades/loans (either overall or of a particular type). In this case, there is no demonstrable effect on credit scores, but overall delinquency declines by 3.1 percentage points. As in the short run, this is driven by a reduction in credit card

delinquency, of about 7.7 percentage points. There is no statistically significant change in delinquency on any other type of debt. This suggests the change in credit scores observed in the overall specification is driven by borrowers opening new accounts (credit usage is another key component in credit scoring).

The bottom panel of table 7 displays results for borrower who had new trades/loans. As in the short run, there is a statistically significant increase in credit scores, as well as a decline in overall delinquency. Looking by loan type, we see that borrowers with new credit cards were 5.3 percentage points less likely to be delinquent on a credit card. This coefficient implies that a $1 increase in the minimum wage reduces delinquency by 9 percent among borrowers with new credit card accounts. One possible explanation for the relatively larger effect on delinquency for borrowers with new credit cards than those with no new cards is the possibility that these borrowers are using a balance transfer option.

For the other types of loans, we see that among borrowers who opened new auto loans delinquency rates increase, on the order of 4.2 percentage points. At the mean, this indicates that a $1 increase in minimum wages increases delinquency among new auto borrowers by 8.4 percent, implying that some borrowers opening new auto loans had problems making timely payments. Given the modest increase in the average number of auto loans in response to minimum wage hikes, these elevated delinquency rates apply to a relatively small group of borrowers. Recall that table 6 indicated a 1.5 percent increase in auto borrowing, thus, this estimate implies that a $1 rise in the minimum wages increases overall auto loan delinquency by

0.13 percent. Moreover, appendix table 7 indicates that, unlike the credit card and credit score results, this result is not robust to changes in the definition of a minimum wage household. [22]

Next, we repeat our borrowing and payment behavior analyses using census blocks with higher concentrations of residents with college educations. We consider this a quasi-placebo test, since these blocks contain fewer residents who would be affected by a changing minimum wage. These results are displayed in table 8. Unlike the analysis on borrowers on blocks with a high concentration of low-skill workers, the top panel of table 8 indicates that for borrowers on more highly educated census blocks, increases in minimum wages are not associated with any measurable increase in the number of credit cards, auto loans, or mortgages, or credit limits on credit cards held by a borrower. If anything, there is a slight *decline* in credit card and auto borrowing, though the effects are modest. Likewise, the middle and bottom panel of table 8 indicate that minimum wage increases are associated with no significant changes in credit scores or payment behavior, either in the short run or the medium run.

Overall, the evidence presented above indicates that increases in minimum wages are followed by increased borrowing in traditional credit markets (mainly via credit cards) and overall improvements in payment behavior and credit scores. We now examine whether such shifts in how affected households interact with traditional credit markets is coupled with changes in how they use AFS credit products, such as payday loans and rent-to-own stores.

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[22] Aaronson, et al. (2012) do not find an increase in delinquency on new auto loans in their data.

3.4   Alternative Financial Service (AFS) Credit Products

3.4.1 Data and Empirical Specification

Data on borrowing via AFS credit products come from the Current Population Survey Unbanked and Underbanked Households Supplement, which has been conducted biennially since 2009 by the Federal Deposit Insurance Corporation in partnership with the U.S. Census Bureau.[23] The data include demographic and economic characteristics of households and information on usage of AFS credit products, including payday loans, rent-to-own stores, and pawn shops. Each of these products are high-interest loans which do not require a credit check.[24] Usually, only a proof employment and a checking account are required. Payday loans are unsecured small-dollar short-term consumer loans, which usually carry an APR of about 400 percent. Pawn shop loans are also small-dollar short-term loans, but they are secured by personal property (e.g., electronics, jewelry, etc.). The effective APR on pawn shop loans is usually about 250 percent and if a borrower does not pay back the loan, the pawn shop keeps the collateral. Rent-to-own loans are loans for durable goods (e.g. furniture, electronics, etc.) which are secured by the good in question, which can be repossessed. The cost of purchasing the goods is typically much higher than if purchased directly, and the implied APRs vary from about 57 percent to 250 percent.

We create indicators for household usage of each product in the past year, and merge in state-level minimum wage information for 12 months prior to the survey date.[25] We define a

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[23] Information on the supplements can be found at https://www.fdic.gov/householdsurvey/

[24] Bhutta et al, forthcoming provide detailed descriptions of each of the AFS products in the CPS data. The statistics in this paragraph were compiled from their summaries.

[25] The question wording changed between 2009 and 2011. We follow Bhutta et al (forthcoming) to harmonize the data across survey waves.

household as a minimum wage household by summing up total hours worked in a year for a family and dividing family income by total hours worked, where again, we use 60 to 120 percent of the state minimum wage as the cutoff.[26] In this data, 3.3 percent of minimum wage households used a payday loan, 4.1 percent used a pawn shop loan, and 2.7 percent rented items from a rent-to-own store. We estimate ordinary least squares regressions of the following form, similar to those used in the credit offer analysis:

$$y_{ist} = \beta_1 \ln(minwage_{s,t-12}) * minwagehousehold_{it}$$

$$+ \beta_2 \ln(minwage_{s,t-12}) + \beta_3 minwagehousehold_{it} + X_{it} + unemp\ rate_{st-12}$$

$$+ \gamma_s + \gamma_y + \varepsilon_{it}$$

Where y_{ist} is an indicator for use of an AFS product for household i in state s in the 12 months prior to the month of the survey (t). $\ln(minwage_{s,t-12})$ is the minimum wage in state s in month t-12 (e.g. one year prior). $minwagehousehold_{it}$ is the indicator for whether or not the household is identified to have a minimum wage worker. X_{it} is vector of demographic characteristics of the household (education, race/ethnicity, and age group). γ_s and γ_y are vector of state and year fixed effects.[27] Standard errors are adjusted for clustering at the state-level.

The coefficient of interest is β_1 which captures the conditional effect of changes in the state-level minimum wage on usage of AFS credit products by minimum wage households. β_2 captures the conditional main effect of changes in state-level minimum wages on usage of AFS

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[26] Since the CPS data collects information on households, which sometimes contain multiple families, we use only the primary family in this calculation.

[27] In additional results in the appendix, we examine the robustness of our results to additional including state-month time trends and census division-year fixed effects, as suggested by Alegretto et al (2011), and interaction terms between the vector of state fixed effects and minimum wage household status. We also provide results with information on state-level payday loan bans (appendix table 10). The results are unchanged.

credit products net of minimum wage household status, all else held constant. We interpret this as the effect of changes in minimum wages on workers who are less likely to be affected by changes in policy. The level term $minwagehousehold_{it}$ captures the level correlation between minimum wage household status and use of AFS credit products. As before, we include the main effect of minimum wage household to facilitate a causal interpretation of β_1, but do not assign a causal interpretation to the coefficient on the main effect since the level correlation between use of AFS credit products and borrower type could be determined by a host of different factors.

3.4.2 Results for Alternative Financial Service Credit Products

Table 9 displays the results of estimating equation (3) on the CPS data on usage of payday loans, pawn shops, and leasing from a rent-to-own store. For each outcome, the coefficient on the interaction term (β_1) indicates that increases in the minimum wage reduces use of AFS products for minimum wage households. For payday loans and rent-to-own stores, these effects are precisely estimated and indicate a statistically significant decrease in usage of those AFS credit products. In contrast, there is a small and statistically insignificant effect of the level term, *Ln(MinimumWage),* indicating that there is no effect of minimum wage changes on usage of AFS credit products for other types of households. At the mean of the dependent variable, these results indicate that $1 increase in the minimum wage reduces usage of AFS credit products by minimum wage households by 40-45 percent.

The level term, *MinimumWageHousehold* is always positive, indicating that, on average, minimum wage households are more likely than other types of households to use AFS products. While the interaction term shows that minimum wage hikes are followed by reduced AFS usage

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for low-income workers, these hikes are generally not large enough to cover the level difference between the income groups. For example, minimum wage households are 14 percentage points more likely to use a payday loan than higher income households, and a $1 increase in the minimum wage narrows that gap by about 1 percentage point. Extrapolating from our results, the minimum wage would need to triple in order to reduce payday loan usage of minimum wage households to the level of higher income households.

The results in table 9 indicate that minimum wage households are less likely to use AFS credit products when minimum wages rise. It is unclear whether this represents substitution away from these products towards traditional credit products versus a discontinuation of use of these products without borrowing elsewhere. While our results cannot directly speak to this question, we offer a few pieces of suggestive evidence. First, as highlighted in the credit report and credit offer data, minimum wage household receive more offers and use more traditional credit when minimum wages are higher. Second, research shows that households who use AFS credit products typically have credit reports: using a linked dataset Bhutta (2013) finds that essentially all payday loan borrowers have credit records, and well over 90 percent have a credit score. This suggests that payday loan borrowers should be covered in both our credit report and credit offer data, and that we are not simply capturing different populations in the two datasets. Finally, we note that the average minimum wage increase observed in our data is relatively small, amounting to about 30 cents per hour. On a monthly basis, for a full time worker, this amounts to around $50 in extra income, which is much smaller than the typical payday loan amount of $100-$500. This suggests the extra income afforded by a typical minimum wage increase is not large enough to cover many expenditure spikes facing a payday borrower.

4. Discussion

Borrowing is critical for smoothing shocks, particularly for low-income households who often have little flexibility in their budgets to cover spikes in expenditures. Using data from credit offer mailings, credit reports, and survey-reported usage of AFS credit products, we find that traditional lenders broadly increase credit supply to low-income households when the minimum wage increases, and in turn, minimum wage households take out new auto loans and credit cards, with higher limits. Minimum wage borrowers also experience increases in their credit scores and decreases in payment delinquency on both new and existing debt. Finally, we find evidence that increased minimum wages reduce low-income households' usage of AFS credit products like payday loans, suggesting that the policies enable households to substitute away from high-cost credit to lower cost, traditional credit.   Overall, we find limited evidence in favor of any adverse effects of this increase in credit supply and use on households' financial circumstances.

Establishing a good credit record and improving one's credit scores increases families' ability to borrow in present, and in the future. Given the importance of debt in smoothing shocks, particularly for low-income families, our results suggest that minimum wages have the potential to create persistent long run positive effects on households' financial circumstances through an increase in liquidity. Moreover, by financing lumpy investments in homes, autos and human capital, debt can provide access to higher paying jobs and facilitate wealth accumulation. Though we leave a formal investigation of long run effects to future work, our results hint that minimum wage policy could have persistent positive ripple effects on household welfare and financial health through the actions of borrowers and lenders in credit markets.

These findings have important policy implications. Proponents of minimum wage legislation tout minimum wages as a way to lift households out of poverty by increasing earnings, but critics argue disemployment effects outweigh earnings gains. Our results show that, regardless of the net effect on income or employment, changes in minimum wages expand access to formal credit to low-income borrowers, and on net, improve affected families credit records and reduce usage of high-cost alternatives to traditional credit products. To our knowledge, this potential benefit of minimum wage policy has not been explored. More broadly, similar to Hsu, Matsa and Meltzer (2014)—who document spillover effects of unemployment insurance on housing and credit markets—our findings suggest that cost-benefit analyses of social policies should consider interactions with credit markets, and the impact that has on financial well-being more generally.

There is growing concern that high-cost alternatives to formal credit products, like payday loans and rent-to-own stores, are predatory and trap borrowers in a cycle of debt.[28] As a result, legislation has begun targeting what are seen as abusive practices, and many states have banned payday lending. However, research on these bans suggests they are not effective at reducing borrowers lending costs. For example, Bhutta et al (2015) find that payday lending bans simply lead borrowers to switch to other high-cost loans (e.g., pawn shops) and not cheaper credit card lending. Our results indicate minimum wage policy, in spite of targeting household income rather than borrowing and lending, is effective at reducing usage of payday and other high-cost AFS credit products among low-income families.

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[28] See, for example, http://www.consumerfinance.gov/about-us/blog/weve-proposed-rule-protect-consumers-payday-debt-traps/

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6. Tables and Figures

Figure 1: Credit Card Offers by Income Bracket in 2005, by State Type
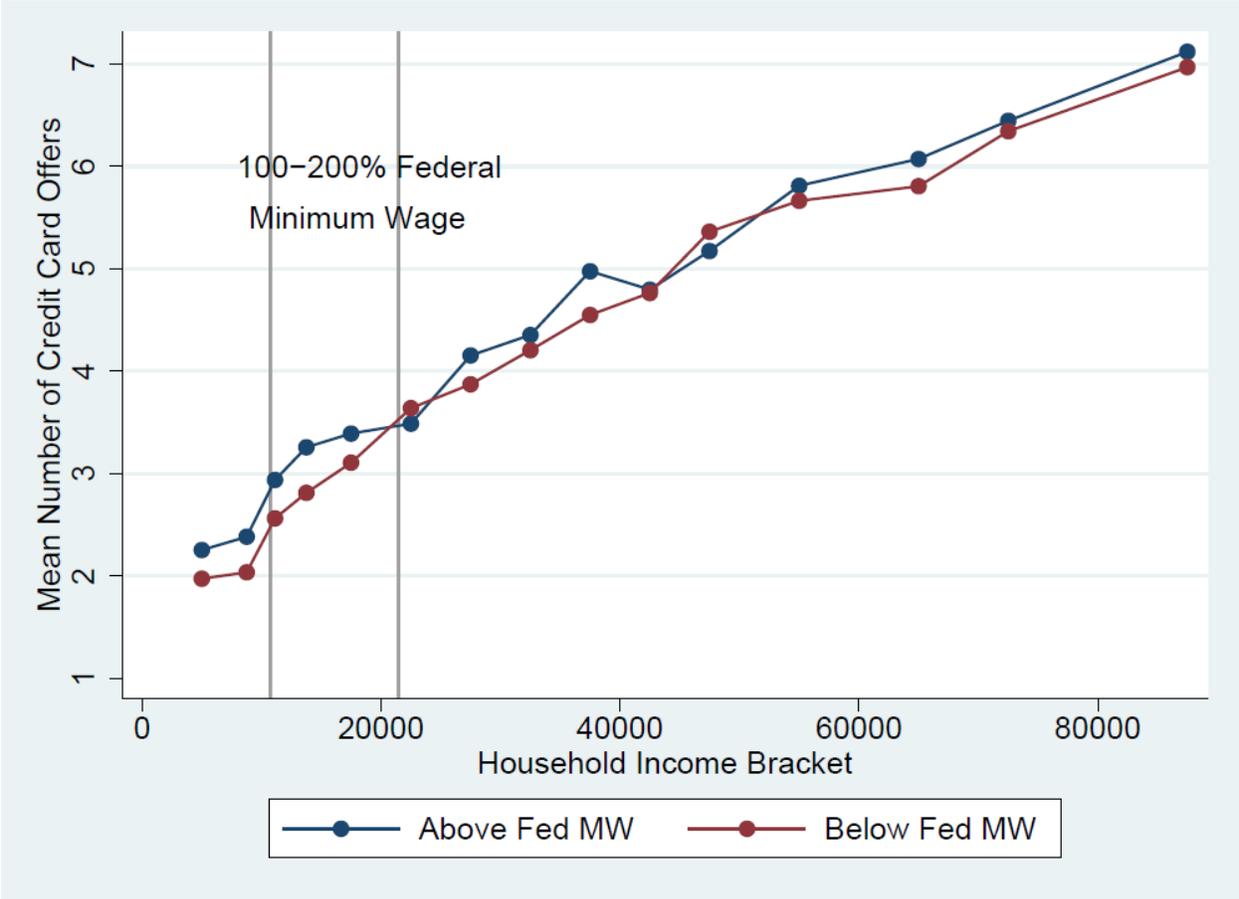
Notes: Data source is Mintel Compremedia. Displayed are mean number of credit card offers in each household income bracket for states with minimum wages above the federal minimum wage or at or below the federal minimum wage.

Table 1: State Minimum Wage Legislation 2000-2014

State	Year(s) Minimum Wage Increased (above Federal)
AK	2003, 2010
AZ	2007, 2008, 2009, 2011, 2012, 2013
AR	2007
CA	2001, 2002, 2007, 2008
CO	2007, 2008, 2009, 2011, 2012, 2013
CT	2001, 2002, 2003, 2004, 2006, 2007, 2010
DE	2007, 2008
FL	2007, 2008, 2009
HI	2002, 2003, 2007
IL	2004, 2005, 2006, 2008, 2009, 2010, 2011
IA	2008
ME	2002, 2003, 2005, 2006, 2008, 2009, 2010
MD	2007
MA	2001, 2007, 2008
MI	2007, 2008, 2009
MO	2007, 2008, 2009, 2013
MT	2007, 2008, 2009, 2011, 2012, 2013
NV	2007, 2008, 2009, 2010, 2011
NH	2008, 2009
NJ	2006, 2007
NM	2008, 2009
NY	2005, 2006, 2007
NC	2007
OH	2007, 2008, 2009, 2011,2012, 2013
OR	2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013
PA	2007, 2008
RI	2001, 2004, 2013
VT	2001, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013
WA	2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013
WV	2007, 2008, 2009
WI	2006, 2007
DC	2005, 2006, 2007, 2009, 2010

Table 2: Summary Statistics Mintel Data

	Mean	SD
Number of Offers		
Credit cards	1.674	2.767
First Mortgage	0.066	0.379
Auto Loan	0.035	0.207
Other Unsecured Loan	0.147	0.511
Credit Card Offer Characteristics		
Mean Credit Limit	28974	32026
Max Credit Limit	34762	37007
Purchase APR	14.33	5.23
Default APR	27.27	3.63
Demographics		
High School Dropout	0.329	0.469
High School	0.413	0.492
Some College	0.166	0.372
Bachelors	0.075	0.263
Post Graduate	0.018	0.133
White (Non-Hispanic)	0.757	0.429
Black(Non-Hispanic)	0.111	0.315
Hispanic	0.136	0.343
Household Income	9655	4436

Notes: Source is Mintel Comperemedia. Sample is households identified as having income consistent with a minimum wage worker.

Table 3: Minimum Wages and Credit Offers Received

	Credit Cards	Auto Loans	Other Unsecured Loans	Mortgages
Ln(MinWage $_{t-3}$)*Min Wage Household	1.8334***	0.0001	0.1571***	0.0775
	(0.2546)	(0.0090)	(0.0324)	(0.0961)
Ln(MinWage $_{t-3}$)	-0.0142	0.0024	-0.0296	0.6050
	(0.2052)	(0.0149)	(0.0479)	(0.3805)
MinWageHousehold	-5.2130***	-0.0226	-0.3496***	-0.3272*
	(0.4368)	(0.0262)	(0.0551)	(0.1601)
N	445201	445201	445201	445201

Notes: Data source is Mintel Comperemedia. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (1). Min Wage Household defined as reported income consistent with one or two minimum wage full time workers, as described in text. Controls include age-group, sex, race/ethnic group, education group, state, and year-month fixed effects and state-month unemployment rates. Standard errors adjusted to allow for clustering at state-level. *p=0.05, **p=0.01, ***p=0.001.

Table 4: Minimum Wages and Credit Card Offer Terms

	Mean Credit Limit	Max Credit Limit	Purchase APR	Default APR
Ln(MinWage $_{t-3}$)*Min Wage Household	14185.8***	35123.1***	2.162***	-1.186***
	(1785.5)	(3652.7)	(0.3719)	(0.2455)
Ln(MinWage $_{t-3}$)	-1736.48	147.124	-0.4809*	0.18543
	(1754.98)	(2905.3)	(0.1982)	(0.2334)
MinWageHousehold	-28258.3***	-69501.7***	0.3434	1.7560***
	(3008.8)	(6091.40)	(0.6442)	(0.4300)
N	172522	172522	162213	116656

Notes: Data source is Mintel Compremedia. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (1). Min Wage Household defined as reported income consistent with one or two minimum wage full time workers, as described in text. Controls include age-group, sex, race/ethnic group, education group, state, and year-month fixed effects, and state-month unemployment rates. Standard errors adjusted to allow for clustering at state-level. *p=0.05, **p=0.01, ***p=0.001.

Table 5: Summary Statistics for CCP/Equifax Data

	Mean	SD
Number of Trades		
Credit Cards	1.79	2.10
Auto Loans	0.40	0.63
Mortgages	0.30	0.56
Delinquent (60 Days Past Due)*		
Any Loan	0.15	0.36
Credit Cards	0.16	0.37
Auto Loans	0.09	0.29
Mortgages	0.05	0.22
Total Balances*		
Credit Cards	4686.2	10173.9
Credit Card (Average Per Card)	1635.1	3447.5
Auto Loans	4850.3	10924.9
Mortgages	155125.6	157656.9
Payments*		
Credit Cards	247.8	5847.5
Credit Card (Average per Card)	90.7	2507.3
Auto Loans	163.9	704.7
Mortgages	1338.8	5581.2
Equifax Risk Score	645.4	106.0
Total Credit Card Limit	14819.3	24305.2
Average Credit Card Limit	4874.8	7823.5

Notes: Source is CCP/Equifax. Sample is borrowers on Census blocks where greater than 50 percent of population is high school dropout. *indicates conditional on having type of loan.

Table 6: Minimum Wages and Borrowing Behavior: Number of Loans by Type and Credit Card Limits

	Credit Card	Auto	Mortgage	Total CC Limit	Average CC Limit
Ln(MinWage $_{t-3}$)	0.1053***	0.0432***	-0.0075	2366.69***	496.21***
	(0.0308)	(0.0107)	(0.0080)	(380.667)	(94.906)
N	7165003	7165003	7165003	4389696	4389696
N (Individuals)	167671	167671	167671	134970	134970

Notes: Data source is CCP/Equifax. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (2). Controls includes individual, age-group, state, and quarter fixed effects, demographic and economic characteristics of census-block-group, state-year unemployment rates. Sample is limited to individuals who have ever resided in Census block-group where more than 50 percent of population has less than a high school degree. Standard errors adjusted to allow for clustering at person-level. *p=0.05, **p=0.01, ***p=0.001.

Table 7: Short and Medium Run Payment Behavior

			Delinquency by Type of Debt		
	Credit Score	Delinquent?	Credit Card	Auto Loan	Mortgage
Short Run					
Ln(Min Wage$_{t-3}$)	8.141***	-0.0537***	-0.014	-0.0039	-0.016
	(1.3248)	(0.0067)	(0.0188)	(0.0101)	(0.0085)
N	5849519	7165003	697107	2138400	1475884
N (Individuals)	160238	167671	36452	93881	51375
Medium Run, No New Trades					
Ln(Min Wage $_{t-12}$)	0.6113	-0.0316***	-0.0296	0.0002	0.0157
	(1.5045)	(0.0084)	(0.0203)	(0.0114)	(0.0087)
N					
N (Individuals)					
Medium Run, New Trades					
Ln(Min Wage $_{t-12}$)	5.9534***	-0.0371***	-0.043	0.0419**	0.0063
	(1.2483)	(0.0066)	(0.0267)	(0.0145)	(0.0169)
N	5523350	6589111	241855	571190	248159
N (Individuals)	154231	167668	32874	87642	47321

Notes: Data Source is CCP/Equifax. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (2). Controls includes individual, age-group, state, and quarter fixed effects, demographic and economic characteristics of census-block-group, state-year unemployment rates. Sample is limited to individuals who have ever resided in Census block-group where more than 50 percent of population has less than a high school degree. Standard errors adjusted to allow for clustering at person-level. *p=0.05, **p=0.01, ***p=0.001.

Table 8: Minimum Wages and Borrowing and Payment Behavior for Highly-skilled Borrowers

	Credit Cards	Auto Loans	Mortgages	Total CC Limit	Average CC Limit
Ln(MinWage$_{t-3}$)	-0.0148	-0.0307**	-0.0349**	584.33	55.57
	(0.0363)	(0.0117)	(0.0120)	(630.76)	(183.62)
N	3555612	3555612	3555612	3118781	3118781
N (Individuals)	71798	71798	71798	69090	69090

Short Run			Delinquency by Type of Debt		
	Credit Score	Delinquent?	Credit Card	Auto Loan	Mortgage
Ln(MinWage$_{t-3}$)	0.4609	-0.0006	-0.0013	0.0055	0.0021
	(1.2400)	(0.0042)	(0.0040)	(0.0047)	(0.0032)
N	2971319	3555612	3118781	912426	1355418
N (Individuals)	70740	71798	69090	41205	39975

Medium Run			Delinquency by Type of Debt		
	Credit Score	Delinquent?	Credit Card	Auto Loan	Mortgage
Ln(MinWage$_{t-12}$)	1.4004	-0.0042	-0.0045	0.0004	0.0025
	(1.0851)	(0.0040)	(0.0038)	(0.0045)	(0.0031)
N	2885571	3340690	2948408	883202	1308091
N (Individuals)	69308	71795	68786	40720	39696

Notes: Data Source is CCP/Equifax. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (2). Controls includes individual, age-group, state, and quarter fixed effects, demographic and economic characteristics of census-block-group, state-year unemployment rates. Sample is limited to individuals who have ever resided in Census block-group where more than 75 percent of population has a Bachelor's degree or more. Standard errors adjusted to allow for clustering at person-level. *p=0.05, **p=0.01, ***p=0.001

Table 9: Minimum Wages and Use of Alternative Financial Services

	Took out a Payday Loan	Sold Items at Pawn Shop	Rented Items at a Rent-to-Own Store
Ln(MinWage $_{t-12}$)*Min Wage Household	-.06558**	-0.0459	-.04973*
	(0.0226)	(0.0308)	(0.0198)
Ln(MinWage $_{t-12}$)	-0.0130	0.0175	-0.0159
	(0.0184)	(0.0117)	(0.0119)
MinWageHousehold	.1368**	0.1009	.10475*
	(0.0455)	(0.0620)	(0.0394)
N	123856	123856	123856

Notes: Data source is Current Population Survey Unbanked/Underbanked Supplements, 2009, 2011 and 2013. Displayed are coefficients and standard errors (in parentheses) obtained from estimating equation (3). Min Wage Household defined as total family income divided by total family hours worked consistent with the minimum wages, as described in text. Controls include age-group, sex, race/ethnic group, education group, and state fixed effects and state-month unemployment rates. Standard errors adjusted to allow for clustering at state-level. *p=0.05, **p=0.01, ***p=0.001.

The appendix to this paper can be found at:
www.umich.edu/~jwhsu/dettling_hsu_minwage_credit_appendix.pdf