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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 reduce poverty, while opponents argue that disemployment effects lead to net welfare losses. But these arguments typically ignore the possibility of spillover effects on other aspects of households' financial circumstances. This paper examines how state-level minimum wages affect the decisions of lenders and low-income borrowers. Using data derived from direct mailings of credit offers, survey-reported usage of high-cost alternative credit products, and debt recorded in credit reports, we find that higher minimum wages increase the supply of unsecured credit to lower-income adults, who in turn, use more traditional credit and less high-cost alternative credit like payday loans. Further, delinquency rates fall and credit scores rise in both the short run and one year later. Overall, our results suggest that minimum wage policy has positive spillover effects by relaxing borrowing constraints among lower-income households, thereby reducing borrowing costs. This reduction in borrowing costs can increase disposable income by 20-110 percent more than the direct effect on earnings alone.

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

JEL codes: D12, D14, J38

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1. Introduction

Minimum wage policies are enacted to raise incomes for low skill workers, with the intended goals 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 the minimum wage may also affect a household's ability to borrow and their interactions with credit markets. Any pass-through of minimum wages to credit markets may weaken or amplify the effects of the policy. If low-income adults face binding borrowing constraints, positive changes in earnings may loosen those constraints, reduce borrowing costs and enable low income households to participate more fully in the economy. But if potential borrowers are sufficiently present-biased, financially illiterate or face self-control problems, over-borrowing and large debt-service burdens could worsen their financial circumstances, potentially mitigating any income gains. And if some adults lose their jobs, they may default on their existing debts, further weakening their financial circumstances and reducing their ability to borrow in the future. Analyzing the ways that minimum wages affect household borrowing is important to fully understanding the consequences of policy.

Our paper examines the impacts of state-level minimum wages on lender and borrower behavior in traditional unsecured credit markets (e.g., credit cards), as well as markets for high-cost alternative credit products (e.g., payday loans). We use data on direct mailings of credit offers, survey data on high-cost credit usage, and panel data derived from credit reports, combined with state-month variation in minimum wage policy to document several novel empirical facts. First, higher minimum wages lead to an increase in the number of unsecured credit offers sent by lenders to low-income borrowers, and increase the favorability of their terms

to borrowers. Second, higher minimum wages reduce usage of payday loans and other high-cost alternatives to formal credit, and increase credit card borrowing and available credit card liquidity. Third, higher minimum wages reduce delinquencies and improve credit scores among low-skilled borrowers; these patterns persist one year out, even among those who took out new cards. This suggests borrowers are better able to manage their (new) debts. We find no corresponding effects of the minimum wage on any of these outcomes among higher income or higher skill workers.

Our full set of results indicate that minimum wages reduce borrowing costs for low income borrowers. Because of the high fees and interest rates associated with missed loan payments, and payday and other high-cost lending, our back of the envelope estimates suggest the reduction in borrowing costs can be substantial: for affected borrowers, the effect of a higher minimum wage on disposable income (that is, income net debt service fees) is 20-110 percent higher than the direct earnings effect alone.

The empirical results we present here complement recent work by Aaronson, Agarwal and French (2012), who examine how consumer spending responds to minimum wage hikes. They document large changes in consumption (relative to changes in income), which they attribute to increases in debt-financed purchases of durables (mainly, autos). Our paper complements and expands upon their analyses by providing a full picture of both lender and borrower behavior in unsecured credit markets in response to minimum wage policy – including changes in credit supply, payment behavior and credit scores, and borrowing via high-cost alternatives to traditional credit products.[2] Our results and theirs are consistent with the notion

[2] Aaronson et al. (2012) provide a comprehensive analysis of changes in income and spending in response to minimum wage hikes, and examine secured and unsecured borrowing levels in order to explain the consumption patterns observed in their data. Our primary focus is on borrowing costs and liquidity (e.g., credit limits, utilization, number of cards, and payment behavior), rather than spending levels, although we do overlap by also analyzing

that borrowing constraints among low-income households are alleviated when the minimum wage is higher.

Our results suggest that higher minimum wages could have persistent positive effects on a household's ability to access affordable liquidity. Credit scores, payment histories, and credit utilization are key components used in underwriting credit applications, and we find evidence of broad improvements in credit records on each of these dimensions under higher minimum wages. All else equal, these changes should positively influence approval rates on subsequent credit applications, improving households' ability to weather future expenditure shocks. New credit could also be used to finance lumpy investments (such as a home, vehicle, or education), further improving economic well-being and enhancing opportunities for economic advancement.[3] 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 higher minimum wages are associated with reductions in delinquency both immediately and one year later, even among those who took out new credit cards. This suggests even the most financially distressed borrowers (those in delinquency) are positively affected by minimum wage policy. For new borrowers, the reduction in delinquency suggests these households are not over-borrowing and are able to manage their debts (at least over the time frame we examine). This sustained reduction in delinquency also speaks to potential interactions between social policy and financial stability.

credit card spending (our samples differ because they use a sample of credit card borrowers and only have credit card spending from a single institution, while we use a credit report-based sample with all credit card spending). We also look at higher-cost credit products (e.g., payday loans) and lender behavior, which they do not analyze.

[3] See, for example, Baum (2009) on the importance of vehicle ownership for employment opportunities and Herbert, McCue and Sanchez-Moyano (2013) on home ownership and wealth accumulation.

We interpret our results as suggestive that higher minimum wages alleviate borrowing constraints in unsecured credit markets, enabling low-income borrowers to avoid higher-cost payday loans in favor of lower-cost credit card borrowing. This finding is particularly notable in light of the limited success of targeted payday loan bans in reducing borrowing costs for low-income families. Bhutta, Goldin, and Homonoff (2016) find that borrowers in states that enact restrictions on payday borrowing switch to other high-cost forms of credit, such as pawn shop loans. In contrast, we find evidence of a reduction in usage across different types of high-cost borrowing. This suggests that policies that address income support or borrowing constraints in traditional credit markets could be effective at reducing both usage of high-cost loans as well as borrowing costs for low-income families.

Broadly, our paper shows that social support programs can have spillover effects on lender and borrower behavior in consumer credit markets, and these spillovers amplify the positive effects of policy. This is consistent with Hsu, Matsa, and Meltzer (forthcoming) who find that more generous unemployment insurance acts as a housing market stabilizer by averting mortgage default and foreclosures. Minimum wages target a lower income segment of the population, but we similarly see amplification of the policy via reductions in payment delinquency and borrowing costs.

The rest of the paper is organized as follows. Section II describes our conceptual framework for understanding how minimum wages affect 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 strategies, and results. We begin with an analysis of credit offers, then proceed to usage of alternative financial service credit products like payday loans in survey data, and finally examine borrowing,

delinquency, and credit scores using credit report data. In Section IV, we take stock of our results and disentangle the relevant mechanisms, and in section V we discuss their policy 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.[4] The general consensus from this literature is there are 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 the income and consumption response to minimum wage hikes, and find that although both rise following a minimum wage increase, the consumption response is nearly three times larger than the income response. Using panel data on borrowing, they find that the excess consumption is financed by increases in collateralized debt, mainly via a small number of families making debt-financed vehicle purchases. Our analyses complement theirs by examining unsecured credit card borrowing, and borrowing outside of traditional credit markets, and we too find minimum wage policy alters borrowing behavior.[5]

[4] 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).

[5] Aaronson et al (2012) use panel data derived from credit reports for a sample of credit card borrowers to examine auto, home equity, mortgage and credit card borrowing, as well as total borrowing. Our samples differ on a number of dimensions: first, their sample consists of credit card borrowers from a single institution, while ours is a random sample of adults with a credit report; second, their data has information on self-reported incomes which can be used to identify minimum wage workers, while our does not and we must use the educational composition of a neighborhood to identify low-skill workers; third, their credit card borrowing consists of cards from a single institution, while ours includes all cards from any institution. We also look at a more expansive set of credit card

One plausible explanation for an increase in borrowing following a minimum wage hikes is that minimum wage policy leads to an expansion in the supply of credit to low-income borrowers. All things equal, lenders are generally willing to extend more credit, and at cheaper terms, to households with higher ability to pay. And if low income borrowers use their increased earnings to improve their credit records (perhaps by paying down existing debts) this could further increase the supply of credit available to those borrowers. Lenders may also respond to the policy itself – assuming that ability to pay will increase for a segment of the population in a particular state – rather than observed changes in individual income.[6]

If minimum wage workers were otherwise borrowing constrained, an increase in credit supply can lead to more borrowing. Indeed, borrowing constraints appear to be a salient feature of minimum wage workers' financial lives: data from the 2001-2013 waves of the Survey of Consumer Finances (SCF) indicate nearly 40 percent of households with adult minimum wage workers are credit constrained (appendix table 1). Some families may not need credit because they have other sources of liquidity, such as savings or family and friends they could turn to in an emergency. The SCF data indicate this is unlikely to be the case for minimum wage workers: the median minimum wage household holds less than two thousand dollars in liquid assets – a tenth of the amount held by the median U.S. household, and only about half of these families report being able to obtain $3,000 from friends and family.

Households who are unable to borrow in traditional credit markets can often still borrow through higher-cost alternative financial service (AFS) credit products, including unsecured debt

borrowing outcomes, such as number of cards, total credit limits and utilization ratios. For comparison, appendix table 2 provides results for collateralized borrowing using our data and estimation strategy. Despite these differences in the sample composition and estimation strategy, our data also indicate an increase in auto borrowing within one year of a minimum wage increase (although the results for one quarter are statistically indistinguishable from zero).

[6] We will discuss the plausibility of each of these mechanisms in more detail when we take stock of the full results in section 4.

such as payday loans, and secured debt such as pawn shop loans, auto title loans and "rent-to-own" furniture agreements.[7] 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 low-income households use these products because they face 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. Indeed, Bhutta, Skiba and Tobacman (2015) find that payday borrowers often shop (unsuccessfully) for traditional credit just before taking out a payday loan.

In addition to possibly facing barriers to borrowing in traditional markets, behavioral biases might be another possible reason some low-income borrowers might utilize AFS borrowing. Any borrowers who use AFS products due to such biases or financial illiteracy are unlikely to substitute away from AFS products when borrowing constraints are relaxed.[8] 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 over-borrowing and a rise in delinquency in the near or long term, as borrowers face difficulties servicing their new debt obligations.

For low-income workers who do not need additional credit, increases in the minimum wage might reduce borrowing and delinquency 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

[7] 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. There is also a tangential literature on the welfare effects of payday lending which examines payday loan bans (see, for example, Meltzer 2011, Dobridge, forthcoming).

[8] For more on the cognitive biases, financial literacy and AFS borrowing, see, for example, Bertrand and Morse (2011), Lusardi and de Bassa Scheresberg, (2013), or Burke, et al. (2016).

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.

Finally, we acknowledge that throughout this discussion we have suggested that minimum wages only positively affect income for adults. While useful for simplifying the exposition, our empirical analysis will be reduced form in nature and agnostic about the size and direction of the effects of minimum wages on income. If there are disemployment effects for adults, then income may fall for some workers, and our predictions for the impacts on credit markets would generally work in the reverse for those workers. [9] We would expect these effects to be most evident on measures of financial distress which are relatively uncommon and typically associated with job loss, such as missed payments and delinquency. Ultimately, the overall reduced form impact of minimum wages on credit markets is an empirical question that we seek to answer.

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

[9] Many studies have estimated negative employment effects of the minimum wage, though many have focused on teen workers, who typically do not interact with credit markets and would not be part of our analyses. See, for example, Neumark and Wascher (2008) for a review.

Economic Policy Institute's Minimum Wage Tracker.[10] 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 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 obtained from direct mail advertising data from 1999 to 2015, which is compiled by Mintel Comperemedia (henceforth, Mintel). 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, and unsecured loan offers received by the household during the month.[11] The data also include the terms of credit for credit card offers, including interest rates, credit limits and whether a credit card has rewards and an annual fee.

Our main analyses will focus on credit card offers, since they represent the vast majority of credit offer mailings and do not require any collateral.[12] We will examine various features of credit card offers, including whether or not the offers are pre-approved (rather than invitations to apply or pre-selected offers), credit limits, interest rates, and annual fees. These outcomes are

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

[11] We limit the sample to households where the head is aged 18-64 in this and all subsequent analysis in order to exclude retirees and teenagers. We exclude teenagers (despite their prominence in the minimum wage literature) because they typically do not have credit reports and therefore would typically not receive credit offers (nor would they be included in the credit report data we use in subsequent analyses).

[12] In appendix table 2 we also investigate secured credit offers (mortgage, auto and home equity loans) and other unsecured personal loans. Analyses of some common secured offers (particularly, mortgage refinance and home equity loan offers) are complicated by differences in asset ownership across groups.

designed to capture the amount of credit supplied (e.g., the number of offers, credit limits and pre-approval) and the cost of borrowing (e.g., interest rates and fees).

Importantly, the Mintel data include information on household income, household size, and the state of residence, which allows us to identify the subset of households which are likely to have a minimum wage worker. To be precise, we identify these households, which we call "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). The top right panel of Table 2 summarizes the outcome variables and general socioeconomic characteristics of minimum wage households in the Mintel data.[13]

We estimate ordinary least squares regressions of the following form:

$$y_{ist} = \beta_1 minwage_{s,t-3} * minwagehousehold_{it} + \beta_2 minwage_{s,t-3} + \beta_3 minwagehousehold_{it} + X_{it} + unemp\ rate_{st} + \gamma_s + \gamma_m + \varepsilon_{it} \quad (1)$$

Where y_{ist} is the credit offer outcome of interest for household *i* in state *s* in month *t.* $minwage_{s,t-3}$ is the minimum wage in state *s* in month *t-3* (one quarter prior).[14] $minwagehousehold_{it}$ is the indicator for whether or not the household is identified to have a minimum wage worker. X_{it} is a 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 a vector of month fixed effects. 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 the state-level minimum wage on credit card offers to households with minimum wage workers,

[13] The top right panel of appendix table 3 summarizes the Mintel data for all households.
[14] We chose one quarter prior to be consistent with the timing in the credit report data used in section 3.4.

relative to other types of households. This coefficient describes how a higher 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 state-level minimum wages on credit card offers net of minimum wage household status, all else held constant. We interpret this as the effect of higher minimum wages on households who should not be affected by the policy because of their incomes.[15] Thus, in this setting, these households act as a control group, and this coefficient will capture any changes in credit availability that may be correlated with minimum wage policy, 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; for example, average credit scores or home ownership rates.

Last, we also control for time-varying state-level economic conditions that might affect credit offers. In particular, our analysis also includes the state-month unemployment rate ($unemp\ rate_{st}$), drawn from the Bureau of Labor Statistics (BLS) local area unemployment statistics. And our analyses also importantly include state and month fixed effects (γ_s and γ_m), so that the estimated 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.

[15] The vast majority of this group is households with higher incomes than those in the minimum wage household group. Henceforth we will refer to these as "higher income households", though a small fraction (under 10 percent) of this group have lower incomes than minimum wage workers (below 60 or 120 percent of the minimum wage, depending on the household size).

3.2.2 Results for Credit Offers

Table 3 presents the results of estimating equation (1) on the outcomes of interest. Column (1) of table 3 presents the result for the number of credit card offers received in the month of the survey. This specification yields a point estimate on the interaction term between minimum wage worker status and the minimum wage (β_1) of 0.1889, indicating that minimum wage workers receive more credit card offers when minimum wages are higher. At the mean, these estimates imply that a $1 increase in the minimum wage would increase the number of credit card offers received by a low income household by 4.7 percent.

On the other hand, we see that the conditional main effect of the minimum wage is small and imprecisely estimated, indicating that higher minimum wages have no effect on the number of offers received by higher-income households. The coefficients on $minwagehousehold_{it}$ indicates that, on average, low-income households receive fewer 2.65 fewer credit card offers per month than higher-income households, 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, under a $1 higher minimum wage, minimum wage households would still receive 2.647 fewer offers per month than higher income households. Extrapolating, our results imply that the minimum wage would need to increase almost fifteen-fold for minimum wage households to receive as many credit card offers as higher income households.

The rest of table 3 narrows in on the terms included in credit card offers received. Note that because not all offers include identical features, the sample sizes vary across columns based on whether a household received any offers which included each feature (e.g, a credit limit, annual fee, or an approval status), and all of the outcomes are calculated only for the subsample

of offers for which the feature is non-missing. Column (2) examines the dollar amount of credit offered, captured by the mean credit limit, and indicates that higher minimum wages are associated with more credit being offered: under a $1 higher minimum wage, credit limits increase by $1126, or 2.8 percent at the mean. Column (3) examines the fraction of offers that are pre-approved, a measure of the strength of the offer, since offers which are not pre-approved can be rescinded upon application. Column (3) of table 3 indicates higher minimum wages are also associated with more pre-approved offers – under a $1 higher minimum wage, the fraction of offers that are pre-approved increases by 1.38 percentage point, or 3.8 percent at the mean. The conditional main effect of the minimum wage in columns (2) and (3) 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 and fewer pre-approved offers. Again, we find that a typical minimum wage increase narrows but does not erase gaps in types of offers offered to minimum wage and higher income households. Extrapolating, our results imply the minimum wage would need to increase twelve-fold in order for minimum wage households to receive as high of credit limits as higher income households, or almost five-fold for minimum wage households to receive as many pre-approved offers as higher income households.

The last two columns of table 3 narrow in on the cost of borrowing, as captured by the mean purchase interest rate (measured as an annual percentage rate, or APR), the fraction of offers for cards with annual fees, and the fraction of offers for cards with fees and no rewards (since rewards cards can have perks, such as airline frequent flyer miles, which offset the annual fee). Column (4) displays the results for the purchase APR, and column (5-6) displays the results for fees. In each case, borrowing costs are lower for minimum wage households when the minimum wage is higher. A $1 increase in the minimum wage is associated with a 6 percentage

point reduction in the offered purchase interest rate (this result is only statistically significant at the 7 percent level but represents a 0.5 percent decline at the mean of the dependent variable), and a 3.98 percentage point (5.2 percent at the mean of the dependent variable) increase in the fraction of offers with no annual fee, and a 1.88 percentage point (19 percent at the mean) reduction in the number of offers with a fee and no rewards. The level term indicates that on average, minimum wage households tend to face higher interest rates and receive more offers with fees (and no corresponding rewards), and as before, we see the minimum wage would need to increase substantially for the borrowing costs offered to high and low income borrowers to converge. Finally, 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 when minimum wages are higher, and the credit that is available is cheaper.

3.3 Alternative Financial Service (AFS) Credit Products

3.3.1 Data and Empirical Specification

Data on borrowing via AFS credit products come from the Current Population Survey Unbanked and Underbanked Households Supplement (henceforth, CPS), which has been conducted biennially since 2009 by the Federal Deposit Insurance Corporation in partnership with the U.S. Census Bureau.[16] The data include demographic and economic characteristics of households found in the CPS monthly survey, as well as information on usage of AFS credit

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

products, including payday loans, rent-to-own stores, pawn shops, and since 2013, auto title loans. Each of these products are high-interest loans that do not require a credit check.[17] 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.) that 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. Auto title loans are loans secured by a clean auto title, wherein default on the loan results in repossession of the vehicle.

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.[18] We define a 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.[19] The top right panel of table 2 summarizes the data for minimum wage borrowers: 3.3 percent of minimum wage households took out a payday loan, 4.1 percent pawned items at a pawn shop, 2.7 percent rented items from a rent-to-own store, and 1.4

[17] Bhutta et al (2016) provide detailed descriptions of each of the AFS products in the CPS data. All of the statistics in this paragraph were compiled from their summaries.

[18] The question wording changed between 2009 and 2011. We follow Bhutta, et al. (2016) to harmonize the data across survey waves.

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

percent took out an auto title loan. We estimate ordinary least squares regressions of the following form, similar to those used in the credit offer analysis:

$$y_{ist} = \beta_1 minwage_{s,t-12} * minwagehousehold_{it} + \beta_2 minwage_{s,t-12} + \beta_3 minwagehousehold_{it} + X_{it} + unemp\ rate_{st-12} + \gamma_s + \gamma_y + \varepsilon_{it} \quad (2)$$

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*). $minwage_{s,t-12}$ 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 a vector of demographic characteristics of the household (education, race/ethnicity, and age group). γ_s and γ_y are vectors of state and year fixed effects. Standard errors are adjusted for clustering at the state level.

The coefficient of interest is β_1 which captures the conditional effect of state-level minimum wages on usage of AFS credit products by minimum wage households. β_2 captures the conditional main effect of state-level minimum wages on usage of AFS credit products net of minimum wage household status, all else held constant. We interpret this as the effect of higher minimum wages on workers who should not be affected by minimum wage 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.

3.3.2 Results for Alternative Financial Service Credit Products

Columns (1)-(4) of Table 4 displays the results for taking out a payday loans, pawning items at a pawn shop, renting items from a rent-to-own store, and taking out an auto title loan,

respectively. For each outcome, the coefficient on the interaction term (β_1) indicates that higher minimum wages reduce usage of AFS products among 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. The coefficients indicate that a $1 increase in the minimum wage would reduce borrowing by 0.49-0.55 percentage points. At the mean of the dependent variable, these represent a reduction in usage of AFS credit products by minimum wage households of 24-36 percent.

In contrast, there is a small and statistically insignificant coefficient on the level term, $minwage_{s,t-12}$ on all four outcomes, indicating that there is no effect of higher minimum wages on usage of AFS credit products for higher income households. The level term, *MinimumWageHousehold* is positive for all of the outcomes (and statistically significant for payday and rent-to-own), 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 higher minimum wages would reduce AFS usage for low-income workers, our results suggest that even rather large increases in the minimum wage would not be large enough to cover the level difference between the income groups. For example, minimum wage households are 4.1 percentage points more likely to use a payday loan than higher income households, and a $1 higher minimum wage narrows that gap by only about half a percentage point. Extrapolating from our results, the minimum wage would need to be nearly 10 times higher in order to reduce payday loan usage of minimum wage households to the level of higher income households.

3.4 Borrowing, Credit Availability, Payment Behavior, and Credit Scores

3.4.1 Data and Empirical Specification

Data on borrowing and payment behavior come from the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (henceforth, CCP/Equifax).[20] 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 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, and the Equifax risk score (a type of credit score).[21]

Our main outcomes of interest are measures of borrower usage of consumer credit cards, borrower-level credit availability, overall credit risk (the credit score), and payment behavior, captured by delinquency, on all debts and specifically on credit cards. We analyze several measures of credit card usage and credit availability: the number of credit cards, total credit available on consumer credit cards, total credit card balances, and credit utilization (the fraction of all available credit being used).[22] Note that because credit card balances are recorded at an arbitrary point in the billing cycle in our data, they conflate credit card spending and debt (e.g., revolvers and convenience users cannot be distinguished). Therefore, our results on balances and utilization ratios should be interpreted with care, since, for example, balances can fall due to

[20] Additional information about the dataset, including sampling and methodology, can be found in Lee and van der Klaauw (2010) at https://www.newyorkfed.org/research/staff_reports/sr479.html.

[21] By design, this dataset only includes individuals who have credit reports, and similar as in the other analyses, we limit the sample to 18-64 year olds. We also eliminate individuals with thin credit records, defined as being in the sample fewer than 4 quarters.

[22] We winsorize credit card balances at 99% and credit card limits at 1% and 99% to account for extreme outliers in the data.

either revolving debts being paid down or declines in spending. We also examine overall payment behavior using an indicator for credit card delinquency, defined as being 60 or more days past due on payments. Finally, we examine borrower credit scores, which are a composite measure of credit risk used by lenders in underwriting, typically determined by payment behavior, credit utilization and length of credit history.

Because this dataset is a panel, we estimate individual fixed effects models of the following form:

$$y_{ist} = \beta minwage_{s,t-k} + age_{it} + unemp\ rate_{st} + X_{ct} + \gamma_s + \gamma_m + \gamma_i + \varepsilon_{it} \qquad (3)$$

Where y_{ist} is the credit outcome of interest for individual *i* in state *s* in month *t.* $minwage_{s,t-k}$ is the minimum wage in state *s* in month *t-k*, where *k=3* (one quarter prior) or *k=12* (one year prior). We conduct our analysis one quarter out to match the previous analyses and additionally look one year out to investigate longer run effects. 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.[23] To overcome

[23] 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.

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 (or block-group) 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.[24]

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 CPS data used in the previous analyses. 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 adults over 25 on the census block-group having less than a high school education.[25] 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. The bottom panel of table 2 describes the CCP/Equifax data for these borrowers.

3.4.2 Results for Borrowing, Credit Availability, Payment Behavior and Credit Scores

Table 5 presents results for the CCP/Equifax data. Columns (1)-(4) examine borrowing behavior and credit availability, as defined by the number of credit cards, and for credit card borrowers, total credit card balances, total credit limits, and the credit utilization ratio. Column

[24] Race/ethnicity and sex are available at the census block level, while the rest of the variables are available at the block-group level. Because we employ individual fixed effects and these controls are time-invariant, they will be differenced out for most borrowers. However, they are instructive for understanding the sample composition.
[25] Appendix figure 1 plots the regional representation of these types of Census Blocks, indicating they are diverse and represent all parts of the country.

(1) indicates that a $1 increase in the minimum wage increases the number of credit cards held by low-skill borrowers by 0.039 cards, or about 2.5 percent at the mean. Column (2) indicates there is no meaningful change in total credit balances. Recall, however, this measure could remain constant even if current spending increases if borrowers concurrently pay down some revolving debt balances.[26] Indeed, column (5) indicates credit card delinquency falls, suggesting some previously delinquent borrowers catch up on missed payments.[27] Column (3) indicates that the total credit limit increases by $425, or 3.7 percent at the mean. This result, in combination with column (1), confirms that the credit card offers results observed in section 3.2 indeed translate into a meaningful expansion in the supply of credit to low-skill borrowers.[28] Finally, column (4) indicates the overall credit utilization ratio falls by 0.14 percentage points, or 2.2 percent at the mean, after a minimum wage increase. This implies that when minimum wages increase, low-skill borrowers subsequently have access to more liquidity.

Columns (5)-(6) of table 5 present the results for payment behavior – as captured by missed payments (delinquency) on credit cards – and credit scores. Column (5) indicates that minimum wages reduce credit card delinquency by 0.8 percentage points, or 3.6 percent at the mean. This suggests that borrowers pay down their debts when the minimum wage rise. Finally, column (6) examines credit scores. Since payment delinquency and utilization are key components of the score, it is not surprising that column (6) indicates that credit scores also improve -- a $1 increase in the minimum wage increases credit scores by about 1.02 points.

[26] There can also be significant measurement error because of differences in the timing of expenditures and payment receipt month-to-month.

[27] We also ran specifications on overall delinquency on all debts (in case borrowers substitute on-time payments between debts) and confirm overall delinquency falls as well (appendix table 3).

[28] We also ran specifications on the average limit per card to investigate if the new cards borrowers took out had higher limits (we cannot observe the limits per card, only the total limit and number of cards). The coefficient on the $Minimum\ Wage_{st-3}$ was 84.49 (statistically significant at the 0.1 percent level), confirming that the new cards indeed have higher limits.

Taken together, the results from columns (4)-(6) suggests that low-skill borrowers would look more attractive to lenders (who underwrite using nearly the same kind of data we use here) following a minimum wage increase, because of their declining credit risk, improved payment behavior and declining utilization of credit.

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 next focus our attention on credit risk and payment behavior one year after a change in the minimum wage. Table 6 displays the results for credit scores and credit card delinquency. Column (1) indicates that after one year, a $1 increase in the minimum wage leads to a sustained increase in credit scores of about 0.46. And column (2) indicates that credit card delinquency falls by 0.7 percentage points (about 3 percent at the mean). Columns (3)-(4) narrow in on borrowers who took out new credit cards in the previous year, in order to confirm that these results hold for those borrowers who took out new debts in response to the policy (as indicated in table 5, column (1)).[29] Indeed, column (3) indicates credit scores for new credit card borrowers increased by 1.8 points, and column (4) indicates delinquency declined for this group as well. This suggests borrowers who took out new credit cards were able to keep up with payments and improve their credit records (at least one year later).

In our previous analyses we were able to use higher income borrowers as a control group to examine whether minimum wages have an impact on borrowers who are unlikely to be affected by the policy. While we do not have income in this data which would allow for a parallel analysis, we can conduct a quasi-falsification test by repeating our borrowing and

[29] Individuals with new credit cards are likely to ex ante have lower credit risk than at least some of the individuals who did not take out a new card (who either applied and were denied, or did not apply due to fear of denial). Still, we are interested in the manageability of this newly extended credit after one year to analyze the possibility that more credit could pose problems for borrowers.

payment behavior analyses using census blocks with higher concentrations of residents with a college education (appendix table 4). Of course, as before, these are only "intent to treat" estimates, and we caution that it is likely that some treated minimum wage workers reside on these blocks as well (though we would expect there to be far fewer than in blocks with a high concentration of low-skilled workers). Unlike the analysis of borrowers on low-skilled blocks, for borrowers on more highly educated census blocks, we find little evidence that increases in minimum wages are associated with changes in borrowing, credit available to borrowers, payment behavior, or credit scores in the short or medium run.[30]

4. Discussion of Mechanisms and Impact on Borrowing Costs

In this section, we explore which mechanisms are consistent with the full set of results, drawing on the conceptual framework outlined in section 2. To summarize, our previous analyses indicate that higher minimum wages lead to:

(1) increases in the number of credit card offers and improvements in their terms,

(2) reductions in usage of payday loans and other forms of high-cost credit,

(3) increases in number of credit cards held and available liquidity on credit cards,

(4) improvements in credit scores and delinquency in the near term,

(5) persistent improvements in credit scores and no increase in credit card delinquency one year out, even for new credit card borrowers, and

(6) no change in any of these credit outcomes for higher income or higher skill workers.

[30] The possible exceptions are the results on credit limits and utilization ratios (which follow mechanically, since limits are the denominator of the ratio) in the short run, and the credit score result one year out. In each case the coefficients are smaller than in the less educated block samples, though they are statistically significant at traditional levels. Note that mean limits and credit scores are much higher in this sample, so as a percent of the mean, these represent considerably smaller effects than those in tables 5-6.

First, because we find no effects on higher income workers (6), our preferred interpretation is that of a causal mechanism; that is, that higher minimum wages cause changes in credit supply (1) and borrower usage of credit products (2-5). We have also conducted numerous robustness checks on our results, including controlling for a host of additional state-level social welfare and income support policies, census-division-year fixed effects and state-year trends (as suggested by Allegretto et al, 2011), and alternative definitions of households that we might expect to be affected by minimum wage policy (appendix tables 5-10).[31] Nearly all of our results were insensitive to these changes in the empirical specification.

Second, because we observe both changes in offers (1) and credit card liquidity (3), we interpret the credit offer results as representing meaningful changes in credit supply to the affected borrowers. A plausible explanation for this result is that the documented improvements in credit risk (4) would make these borrowers more attractive to lenders. When considering or underwriting potential customers, credit card companies see the same kinds of credit report data that we analyze, and create their own proprietary credit scoring algorithms for generating credit offers. Positive changes in credit scores, utilization, and payment behavior generally lead to more and better offers. It is also possible that the lenders respond to the policy itself, perhaps with the belief that changes in minimum wages might affect demand for credit among certain household-

[31] The top panels of appendix tables 5-7 examine the robustness of the results when including additional policy control variables obtained from the University of Kentucky Center for Poverty Research (including AFDC, SNAP, SSI, EITC, among others, as noted in the table footnotes). In the Mintel and CPS results, the bottom panels of appendix tables 5-6 we further examine robustness to additional fixed effects (we do not do this in the CCP/Equifax because those analyses use individual fixed effects). Results are almost identical, with one exception: in the CPS, including the full set of extra fixed effects (bottom panel of appendix table 6) reduces the precision of the payday results, although the magnitude of the coefficient is similar. Appendix tables 8-10 examine the sensitivity of the results to alternative definitions of potentially affected workers (e.g., alternative definitions of "minimum wage households"). In the Mintel and CPS data we continue to use information on imputed wages (top panel appendix tables 8-9) and household/family incomes (bottom panel of appendix tables 8-9) to look at heterogeneity across a broader range of households. In the CCP/Equifax, we use alternative census-block-group characteristics (including median incomes, employment in food services/retail, and different education groups, appendix table 10). In each case, there is evidence for effects on a wide range of incomes/wages/household-types who are likely to engage in minimum wage work.

types. While lenders do not see income information on households who are not their customers, credit scores are highly correlated with income (Federal Reserve Board, 2007). As such, a lender could target certain parts of the credit score distribution in states where minimum wage policy has changed.[32] Hsu, Matsa, and Meltzer (2014) find that more-generous unemployment insurance not only reduces mortgage delinquency but also increases credit card offers and improves their terms for borrowers, further providing support for the notion that credit supply is sensitive to changes in social policy.

Third, because we see both reductions in payday borrowing (2) and increases in credit cards (3), we interpret this as evidence that there is at least some substitution between payday and traditional borrowing. There are a few pieces of suggestive evidence in support of this interpretation. First, research shows that households who use AFS credit products typically have credit reports: using a linked dataset Bhutta, Skiba and Tobacman (2015) finds that essentially all payday loan borrowers have credit records, and well over 90 percent have a credit score. This suggests that most payday loan borrowers should be covered in both our credit report and credit offer data. Second, Bhutta, Skiba and Tobacman's (2015) linked data also indicates that most payday borrowers resort to payday loans when their access to traditional credit is lowest (e.g., when little or no liquidity remains on any credit cards they may have), and many shop (unsuccessfully) for traditional credit just before they take out a payday loan. This suggests AFS borrowers would be interested in using traditional credit if they could qualify for it. Last, the typical minimum wage increase in our data is around $50 in extra income on a monthly basis for

[32] We have had numerous conversations with credit card companies about the plausibility of these different mechanisms. Since marketing strategies are proprietary, none were willing to go on the record about the strategies, however, we were told off the record that both mechanisms seem plausible. One suggestive piece of evidence that minimum wages are an important consideration of lenders and credit reporting agencies is the following report on minimum wages prepared by Equifax: https://investor.equifax.com/~/media/Files/E/Equifax-IR/documents/presentation/minimum-wage-wp-may-2014.pdf.

a full time worker. This increase is much smaller than the typical payday loan amount of $100-$500. This suggests the extra income generated by a typical minimum wage increase is not large enough to cover many expenditure spikes faced by payday borrowers, so they would likely still need to borrow to meet their spending needs.[33]

Fourth, because we see reductions in payday borrowing (2) and improvements in credit records on new credit card borrowers (5), we interpret our results as a rejection of the hypothesis that these changes in credit supply lead to over-borrowing among low-income households (at least over the time period we observe). More generally, this suggests our results are not consistent with widespread present-bias or financial illiteracy among these populations. Instead, we interpret the full set of our results as consistent with widespread (and binding) borrowing constraints faced by these populations which can be alleviated by income support policy.

Our full set of results indicate that higher minimum wages can lead to reductions in borrowing costs among low income borrowers, since credit card borrowing (3) is generally cheaper than payday borrowing (2), and staying current on credit card is cheaper than paying late fees and interest charges (4). To fully understand the potential magnitude of these changes, consider that the typical payday borrower borrows $345, rolling the loan over for five months and paying $520 in fees (PEW, 2016). If that borrower were instead to borrow that amount and revolve that balance on the most expensive type of subprime credit card for the same 5 months, they would save about $370. If instead they revolved that balance on a typical credit card, they would save $456. Switching from a high-cost subprime card to traditional card saves that borrower about $85. Even for non-revolvers, switching from payday to credit cards would save

[33] Since we only look at ever using a payday loan in the past year, it is possible the changes we observe are driven by occasional payday users. If those users are able to save the extra income throughout the year, that extra income could be enough to avoid borrowing on payday loans altogether.

$55 a month.[34] Aaronson et al (2012) estimate income effects for the average minimum wage household of a $1 change in the minimum wage at around $250 per quarter (or about $415 for 5 months). In terms of discretionary spending, these changes in borrowing costs are therefore quite substantial for affected households: increasing disposable income (income net of debt service payments) by 20-110 percent above and beyond the pure earnings effect of the minimum wage change. If we further consider the effect on total available liquidity – that is, net income plus available credit card liquidity, the effects are even larger, since every $1 increase in the minimum wage would increase borrowers' credit card limits by $425.

With respect to the vast literature on employment effects of minimum wage increases, we urge caution that our data do not contain information about employment status, and as such, our results are averaged over adults who could have experienced positive or negative employment (and earnings) effects under higher minimum wages. That said, our results are all broadly consistent with positive earnings and employment outcomes widespread enough to offset any negative outcomes. The results for delinquency are particularly striking: we find evidence of exits from delinquency, rather than entries, which one might have expected to be a possible outcome among job losers. Exits from delinquency also indicate that even the most financially distressed (ex ante) low skill borrowers —not just the average— are positively affected by minimum wage increases.[35]

[34] The typical subprime card has fees and APR charges of about 40 percent, the typical mainstream card has fees and APR charges about 17 percent (CFPB, 2015) , and the typical fee on a two-week payday loan which is not renewed is $55 (PEW, 2016).

[35] We might conduct some sort of inframarginal analysis to quantify the impact on and relative size of groups with positive and negative credit outcomes. Such an analysis, though, would not be very straightforward in our setting for a number of reasons. For example, unemployed individuals might still receive more credit offers since the lenders whose credit supply effects we measured in (1) would also be unable to observe employment status. Moreover, unemployed people would potentially have great need for credit in order to smooth their expenditures across their unemployment spell. Methodologically, because most of our outcomes are either binary or count variables, we cannot analyze those outcomes with commonly used inframarginal analytical tools like quantile regression. We do

As a final caveat, we note that much of the current public discussion about minimum wages surrounds a target of $15 an hour. State level minimum wages range from $5.15 to $10.50 per hour during our analysis period, and we do not have enough information to extrapolate further out of sample. We leave it to future research to analyze some of the higher minimum wages set by local jurisdictions on credit market outcomes and borrowing costs.

5. Conclusion

Borrowing is critical for smoothing shocks, particularly for low-income households who often have little flexibility in their budgets to cover spikes in expenditures. Establishing a good credit record and improving one's credit scores increases families' ability to borrow both in present and in the future. Thus, the changes in credit supply and borrowing behavior we document in our empirical analyses suggest that minimum wages have the potential to create persistent long run positive effects on households' financial circumstances through an increase in liquidity. By financing lumpy investments in homes, automobiles 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.

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 minimum wages expand access to formal credit to low-income borrowers, and reduce usage of high-cost alternatives to traditional credit

note, however, that appendix tables 8-10 provide some evidence that positive effects are widespread, although the magnitudes do vary somewhat across the income/wage/household type distributions.

products, and on net, reduce borrowing costs. 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 borrowing costs and financial well-being more generally.

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7. Tables and Figures

Table 1: State Minimum Wage Legislation 2000-2015

State	Minimum Wage Jan, 2015	Year(s) Minimum Wage Increased (above Federal)	State	Minimum Wage Jan, 2015	Year(s) Minimum Wage Increased (above Federal)
DC	$9.50	2005, 2006, 2014, 2015	OH	$8.10	2007, 2008, 2009, 2011,2012, 2013, 2014, 2015
WA	$9.47	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015	AZ	$8.05	2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015
OR	$9.25	2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015	FL	$8.05	2005*, 2006, 2007, 2008, 2009, 2011*, 2012, 2013, 2014, 2015
CT	$9.15	2000, 2001, 2002, 2003, 2004, 2006, 2007, 2009, 2010, 2014, 2015	MT	$8.05	2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015
VT	$9.15	2001, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015	MD	$8.00	2007, 2015*
CA	$9.00	2001, 2002, 2007, 2008, 2014	MN	$8.00	2005*, 2014, 2015
MA	$9.00	2000, 2001, 2007, 2008, 2015	NE	$8.00	2015
RI	$9.00	2000*, 2004, 2006*, 2007, 2013, 2014, 2015	WV	$8.00	2006, 2015
AK	$8.75	2003, 2010, 2015	HI	$7.75	2002, 2003, 2006, 2007, 2015
NY	$8.75	2005, 2006, 2007, 2014, 2015	MO	$7.65	2007, 2008, 2009, 2013, 2014, 2015
SD	$8.50	2015	AR	$7.50	2006, 2014
NJ	$8.38	2005, 2006, 2014, 2015	ME	$7.50	2002, 2003, 2004, 2005, 2006
DE	$8.25	2000, 2007, 2008, 2014, 2015	NM	$7.50	2008, 2009
IL	$8.25	2004, 2005, 2010	IA	$7.25	2007, 2008
NV	$8.25	2006, 2007,2010	NC	$7.25	2007
CO	$8.23	2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015	PA	$7.25	2007
MI	$8.15	2006, 2014	WI	$7.25	2005*, 2006*

Observe federal: AL, GA, ID, IN, KS,KY, LA, MS, ND, NH, OK, SC, TN, TX, UT, VA, WY
*Multiple changes in year

Table 2: Summary Statistics for Mintel, CPS and CCP/Equifax

	Mean	SD		Mean	SD
Mintel Data			*CPS Data*		
Number of Credit Card Offers	2.439	3.433	Took out a Payday Loan	0.030	0.171
Mean Credit Limit	27230	30073	Pawned Items at a Pawn Shop	0.040	0.195
Fraction of Offers Pre-Approved	0.361	0.388	Rented Items at a Rent-to-own Store	0.029	0.169
Mean Purchase Interest Rate	14.602	4.713	Took out an Auto Title Loan	0.014	0.117
% Offers with No Fee	0.724	0.379			
% Offers with Fee, No Rewards	0.186	0.346			
Median Income*	22500	7681	Median Family Income*	22500	33099
High School Dropout	0.144	0.351	High School Dropout	0.183	0.387
High School Grad	0.401	0.490	High School Grad	0.369	0.483
Some College	0.266	0.442	Some College	0.311	0.463
College	0.159	0.365	College	0.108	0.311
Post-Graduate	0.030	0.170	Post-Graduate	0.028	0.164
White	0.709	0.454	White	0.577	0.494
Black	0.084	0.278	Black	0.129	0.336
Hispanic	0.210	0.407	Hispanic	0.224	0.417
Under Age 25	0.045	0.206	Under Age 25	0.122	0.328
Age 25-34	0.176	0.381	Age 25-34	0.257	0.437
Age 35-44	0.228	0.420	Age 35-44	0.224	0.417
Age 45-54	0.252	0.434	Age 45-54	0.238	0.426
Age 55-64	0.299	0.458	Age 55-64	0.159	0.366
CCP/Equifax Data					
Number of Credit Cards	1.555	2.016	*Census Block-group Characteristics (CCP/Equifax)*		
Credit Card Limit	11638	17062	Block Median Income	35330	17749
Credit Card Balance	4019	6610	Share White	0.342	0.340
Credit Card Utilization Rate	0.643	0.682	Share Black	0.172	0.279
Credit Score	621	102	Share Hispanic	0.416	0.355
Delinquent	0.195	0.396	Share Male	0.492	0.070
Under Age 25	0.101	0.301	Share High School Dropout	0.405	0.210
Age 25-34	0.284	0.451	Share High School Grad	0.243	0.087
Age 35-44	0.274	0.446	Share Some College	0.216	0.100
Age 45-54	0.213	0.410	Share College or More	0.089	0.090
Age 55-64	0.128	0.334			

Notes: Source is Mintel Comperemedia, Current Population Survey and CCP/Equifax. Data is for 2000-2015 in Mintel, 2009, 2011, 2013 and 2015 in CPS, and 1999-2015 in CCP/Equifax. In Mintel and CPS, the sample is households identified as having income consistent with a minimum wage worker. In the CCP/Equifax, the sample is individual who have ever lived on a Census Block-groups where more than 50 percent of the adult population was a high-school dropout in 2000. * indicates variable expressed as median.

Table 3: Minimum Wages and Credit Card Offers Received

	(1) Number of Credit Card Offers	(2) Mean Credit Limit	(3) Fraction of Offers Pre-Approved	(4) Mean Purchase Interest Rate	(5) Fraction of Offers With No Annual Fee	(6) Fraction of Offers w/ Fee and No Rewards
Minimum Wage$_{st-3}$*Minimum Wage Household$_i$	0.1889***	1126.17***	0.0138***	-0.0603	0.0398***	-0.0188***
	(0.0373)	(291.05)	(0.0028)	(0.0323)	(0.0029)	(0.0027)
Minimum Wage$_{st-3}$	0.0589	103.60	-0.0016	0.0447	0.0012	-0.0038
	(0.0433)	(333.42)	(0.0020)	(0.0294)	(0.0029)	(0.0027)
Minimum Wage Household$_i$	-2.6474***	-14182.29***	-0.0811***	1.0801***	-0.3048***	0.2016***
	(0.2276)	(1788.61)	(0.0201)	(0.1972)	(0.0182)	(0.0173)
Mean of Dependent Variable	4.05	40098	0.36	13.39	0.77	0.10
N	315832	133875	221017	223079	224309	219990

Notes: Data source is Mintel Comperemedia 2000-2015. Displayed are coefficients and standard errors (in parentheses). Minimum Wage Household defined as reported income consistent with one or two minimum wage full time workers, as described in text. Sample includes households with working age adults 18-64, and for columns (2)-(6), households who received offers with the feature listed in the column heading. 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 Use of Alternative Financial Services

	(1)	(2)	(3)	(4)
	Took out a Payday Loan	Pawned Item at Pawn Shop	Rented Items from a Rent-to-Own Store	Took out an Auto Title Loan
Minimum $Wage_{st-12}$*Minimum Wage $Household_i$	-0.0049*	-0.0053	-0.0055**	-0.0023
	(0.0027)	(0.0038)	(0.0023)	(0.0017)
Minimum $Wage_{st-12}$	-0.0026	0.0016	-0.0009	0.0014
	(0.0025)	(0.0019)	(0.0014)	(0.0026)
Minimum Wage $Household_i$	0.0414**	0.0484	0.0485***	0.0203
	(0.0202)	(0.0296)	(0.0175)	(0.0135)
Mean of Dependent Variable	0.0203	0.0223	0.0154	0.0088
N	157896	158001	157974	74488

Notes: Data source is Current Population Survey Unbanked/Underbanked Supplements, 2009, 2011, 2013 and 2015 (column 4 data is for 2013 and 2015 only). Sample includes households with working age adults 18-64. Displayed are coefficients and standard errors (in parentheses)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.

Table 5: Minimum Wages and Credit Card Borrowing, Credit Risk and Payment Behavior

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Credit Cards	Credit Balance	Credit Limit	Credit Utilization	Delinquent on Credit Card(s)	Credit Score
Minimum $Wage_{st-3}$	0.039***	-4.858	425.369***	-0.014***	-0.008***	1.023***
	(0.0045)	(15.4918)	(33.1851)	(0.0013)	(0.0009)	(0.1388)
Mean of Dependent Variable	1.555	4019	11638	0.643	0.226	621
N	11299458	6762080	6762080	6762080	6762080	11299458

Notes: Data Source is CCP/Equifax 1999-2015. Sample includes adults 18-64. Displayed are coefficients and standard errors (in parentheses). 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 the population over age 25 had no high school degree in 2000. Standard errors adjusted to allow for clustering at person-level. *p<0.05, **p<0.01, ***p<0.001

Table 6: Minimum Wages and Credit Risk and Payment Behavior One Year Later

	(1)	(2)	(3)	(4)
	All Borrowers		New Credit Card Borrowers	
	Credit Score	Delinquent on Credit Card	Credit Score	Delinquent on Credit Card
Minimum $Wage_{st-12}$	0.455***	-0.007***	1.845***	-0.004***
	(0.1336)	(0.0009)	(0.2355)	(0.0011)
	621.4	0.229	632.1	0.164
N	10541546	6354459	2038541	2029613

Notes: Data Source is CCP/Equifax 1999-2015. Sample includes adults 18-64. Displayed are coefficients and standard errors (in parentheses). 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 the population over age 25 had no high school degree in 2000. Standard errors adjusted to allow for clustering at person-level. *p<0.05, **p<0.01, ***p<0.001