

Report of the Consumer Financial Protection Bureau Academic Research Council

A Review of the *Property Assessed Clean Energy (PACE) Financing and Consumer Financial Outcomes* Draft Report

June 30, 2023

Members of the Academic Research Council reviewed the report. Below is a consolidated summary of members' remarks and suggestions, followed by a full set of specific comments from each reviewer in the Appendix.

Background

1. Additional information about why CFPB is examining PACE loans would help motivate the study. Beyond what anecdotally are characterized as questionable marketing practices, what suspected problems with PACE loans with respect to consumer outcomes make it important to conduct this study?
2. More information is needed concerning why PACE loans are repaid through property tax bills and how fees are paid – up front or rolled into the loan? Also, why do these loans exist in the market? What value do they offer consumers that cannot be offered by other forms of credit? What specifically is the reason why the loan is repaid via property taxes?
3. There's no consideration of how PACE loans could provide economic benefits relative to the increased risk of mortgage delinquency, including energy savings and increased property values. In general, the topic is framed in a way that seems to assume negative consumer outcomes.
4. In terms of pricing, PACE loans should be compared to Home Equity Loans or Home Equity Lines of Credit (HELs/HELOCs), which actually have very similar APRs as PACE loans. The key difference with PACE loans is that loan payment is bundled with mortgage payments, and often property tax and insurance payments. In contrast, while HELs/HELOCs, like mortgages, are secured with property, payment problems with HELs/HELOCs do not put the mortgage loan at risk.
5. Home energy-related rebates and tax credits under the Inflation Reduction Act could be mentioned. These rebates and tax credits could affect demand for PACE loans.
6. PACE loans and property taxes are conflated. The statement on page 13: "This means that on average a consumer's total property taxes likely increased by almost 88 percent as a result" is factually incorrect. The property tax *bill* increased by this amount, which is unremarkable because it just reflects the bundling of the PACE loan payment.
7. Interest rate comparisons for PACE loans should not be made with mortgages, but with HELs/HELOCs. This seems like an apples-to-oranges comparison.

Methods

8. **Comparison group.** Using the Applicant group (those who were approved for, but did not originate a PACE loan) as a comparison group is helpful in terms of self-selection, yet we don't know whether applicants used some other form of credit like HELs/HELOCs. A clearer signal for the impact estimate would be to compare consumers who took PACE loans with those who took HELs/HELOCs or some other credit option. This would isolate the effects of PACE loans (with respect to structural characteristics as a credit option) on mortgage delinquency.
9. **PACE loans as an exogenous predictor.** Absent a "apples to apples" comparison of PACE loans to other credit products, it may not be PACE loans per se that are predicting mortgage

delinquency, but an increase in indebtedness and debt-to-income (DTI) ratios, which we know are strong predictors of delinquency. Whether Applicants accepted another (possibly cheaper) loan for the same project vs. not borrowing at all is a critical distinction. Looking at other debts would help to disentangle whether the effect of the PACE loan provision is to lower the cost of the same project (intensive margin cost), or whether it is to increase the households' debt service burden with an additional lien (extensive margin). In addition, perhaps an outcome might include whether the intended function of PACE loans are met with respect to increases in property values (including among homeowners who improved their properties and sold their homes at a higher price) and/or energy savings.

10. **Parallel Trends/heterogeneity.** While the parallel trends assumption seems mostly intact to support DiD estimates, it may still help to consider sample balancing on pre-PACE characteristics, including the differences between originators and applicants in pre-PACE mortgage delinquency and home equity (if available). There may be further issues with the parallel trends when looking at sub-populations, as subprime borrowers may be less likely to have an outside option for borrowing, for instance. The differences in outcomes are much more heterogeneous by credit score than by other attributes, such as tract income. Also, might outcomes vary with respect to PACE loan characteristics? Is it possible to compare outcomes between borrowers whose loan payments are bundled with their mortgage payments versus repaid separately with their property tax bills (quarterly, semi-annually, annually)? Similarly, do you have any additional data on property characteristics that might help explain variation in the outcome, e.g., the nature and scope of the property improvement project? What about rates of change in property tax assessments?

Conclusions

11. Be careful about causal interpretations. For example, regarding the claim that PACE loans "caused" increases in credit card balances among those without a pre-existing mortgage, there are many plausible reasons. For example, homeowners without mortgages tend to own older homes, energy-related improvements for which (e.g., replacing original windows, replacing cast iron pipes, insulating a home built prior to 1940) are more costly and may exceed PACE loan amounts, hence the spike in credit card balances to finance the entire project.
12. Re-consider conclusions concerning results from the California study. There does not seem to be sufficient evidence to surmise that changes in marketing practices had more of an impact than changes in ability-to-repay (ATR) standards.

APPENDIX: Individual Reviewer Comments

Reviewer 1

Selection Bias

1. The key concern is selection: Those who went forward and originated the loan may be different than those who applied for the loan and were approved but chose not to go forward ("Application-Only"). The authors are very clear about this limitation, but I think they can do more to explore its implications.
2. The fundamental selection question is: Who applies for a loan, is approved, and then turns it down? Likely someone who has other options to fund home improvements, such as a HELOC, a 401(k) loan, FEMA grants or SBA Federal Disaster Loan (in the case of disaster repairs), or savings. Table 6 supports this interpretation, as application-only (column 2) have higher credit scores and lower credit card utilization rates, suggesting more liquidity and possible alternative sources of credit.
3. The issue with selection is that in some cases like disaster repairs, we would expect applicant-only consumers to ultimately borrow elsewhere, whereas others may decide that it is not worth it at this time (or at this cost of interest + fees). So the selection issue is one that relates to how spending and borrowing evolves in subsequent years.
4. Further, the parallel trend assumption imposes that credit outcomes would have evolved similarly if they had not accepted the loan. So whether they accepted another (cheaper) loan for the same project vs. not borrowing at all is a critical distinction. The authors could examine whether HELOC balances or other debts increase among those who turn down the loan. On page 28 the authors speculate as to whether "super-prime" borrowers have more access to HELOCs, but this could be investigated directly. Unfortunately, the other sources I mentioned (401k, FEMA grant, SBA loan, savings) are generally not observable in the credit record. Looking at other debts would help to disentangle whether the effect of the PACE loan provision is to lower the cost of the same project (intensive margin cost), or whether it is to increase the households' debt service burden with an additional lien (extensive margin).
5. The authors could also do more to examine trends prior to application, and consider alternative approaches to balancing on observables. Figure 8 shows plausibly parallel trends in panels a, b, and d, but differential accumulation of credit card debt in panel c. The text says that card balances diverge post-PACE, but looking at the trends, they seem to diverge pre-PACE as well. Figures A7 and A8 show a divergence in credit card delinquency rates prior to the PACE loan.
6. There may be further issues with the parallel trends when looking at sub-populations, as subprime borrowers may be less likely to have an outside option for borrowing, for instance. The differences in outcomes are much more heterogeneous by credit score than by other attributes, such as tract income.
7. A related concern is found in the appendix (and discussed on page 29) when using denied consumers as part of the "control" group. If denied consumers are on a trend to have poor outcomes, then isn't it surprising that the effect of PACE loans is even worse when using the denied as a control group? What is the best way to reconcile that result? The results in Table A5 appear to make it look like it is far better to be denied a PACE loan than to be approved, with more mortgage delinquency, more credit card delinquency, and lower credit scores!

8. The authors could use synthetic control methods or other approaches to further balance the treatment and control groups on observables, or explore other drivers of loan approval in an intent-to-treat framework, to better address these selection concerns.

Organization

9. In terms of organization, I expected to see a Table with summary statistics of the program applicants, those approved, and those who take-up the loan conditional on approval but those who do not as “Table 1.” I don’t know what we learn from the current version of Table 1. There is no discussion of why the denial rates changed so substantially over time and it appears across states (much bigger increase in denials in FL vs. CA).
10. Across Tables 2, 4, and 5 the sample sizes are changing, and then restrictions are made to focus on FL and CA without clearly motivating why. I would either make the samples consistent or add a note as to why they are different in each table (presumably data availability). Given that the analysis focuses on FL and CA, it may make more sense to focus in on those two states sooner.

Additional points

11. Can the authors say something about why the loans are repaid through the property tax bill? Is this related to the ease of the tax foreclosure process vs. other collections approaches? Does it matter whether the loans are repaid through escrow?
12. Given that the PACE programs are usually administered by private companies, I was expecting a richer discussion of the fees and effective APRs in the program in the introduction. Fees are discussed on page 15. Are the fees paid up front or rolled into the balance or the rate? There are clear parallels to student loan originations by private lenders vs. direct from the government.
13. Typo in the label to Figure 3
14. It isn’t clear why Figure 4 is included. What hypothesis does Figure 4 and what do we learn from it?

Reviewer 2

The paper documents rather strong effects of having a PACE loan on subsequent delinquencies. It reflects common standards for social science research and its results seem warranted given the available data. Nonetheless, in the spirit of strengthening inferences, I do offer some suggestions that might be helpful.

1. The major component of this analysis is the contrast between those homes that have been approved for a PACE loan and did not originate but were approved for a PACE loan. The observed difference in defaults. As the paper states: “Because there are some differences between Originated consumers and Application-Only consumers in the characteristics we observe, it is important to consider the ways in which this could influence our analysis and undermine the parallel trends assumption.” The authors provide data on several variables, and discuss the possible implications, but of course with this kind of analysis, it is not just the observed characteristics, but also unobserved characteristics that could account for the effect.

2. Let me applaud the authors on doing a nice job of making arguments about the observed variables, although I note that variables like credit scores (figure 8d) and HVAC (figure 7) show sizable differences. I wonder if such variable might reflect the marketing practices of the loan providers: Maybe they are targeting HVAC and Super Prime borrowers who have other options, or maybe the firms that originate loans are targeting their mirror images (lower credit worthy firms. Thus, differences in outcome could reflect the targeted marketing of the loan providers as well as the lack of 'other options'. Perhaps the models could be strengthened by including these variables, in the analysis. Do the investigators have such data? At a minimum including the identity of the company originating the loan, or details of their marketing practices (advertising medium, targets, post-origination communications, etc.) would strengthen these inferences. This is an important result and strengthening our confidence even more would be an important goal.

Reviewer 3

1. While the evaluation explicitly asks not to evaluate the policy implications, the PACE study would benefit from explicitly stating what the agency problems are which appear to be one focus of the paper. In particular, the authors write (p.4) **"The data show some evidence of problematic sales practices for PACE loans.** A little more than 13 percent of PACE borrowers received multiple PACE loans, with many of these loans originated simultaneously or within a few months of each other." Is this a negative externality imposed by later issuers diluting the debt of earlier originators?
2. Another related point on p.4 concerns the statement "PACE loans have interest rates that are substantially higher than normal rates for mortgages or home equity loans (although much lower than credit card rates), and they have high fees relative to the size of the loans". If the borrower has access to a home equity loan at lower interest rate, why did they not take it? Is this the problematic sales practice or did they actually not have access?
3. It would be helpful to clarify statements like (p.3) "We find that, compared to PACE applicants who did not ultimately obtain a loan, getting a PACE loan increases mortgage delinquency rates by 2.5 percentage points over a two year period following the PACE origination." Use of the word "obtain" should be clarified. Was the PACE applicant rejected or did the applicant choose not to accept the loan? The authors tend to do a good job of trying to account for **selection** in their empirical work, but it doesn't always filter to the text.
4. While the authors condition on many factors in their empirical analysis in Section 4, is there any data on amount of home equity? This would be correlated with borrower age, but probably not perfectly. This would seem to be an important factor in delinquency/foreclosure decisions. In the dynamic analysis, are the authors able to condition on the evolution of income?
5. The most important part of the paper concerns the evaluation of the California policy experiment which focused on borrower ability to pay. Consistent with the point raised in bullet 1 above is the authors statement on p. 50 "The decline in PACE applications is more consistent with the new laws resulting in shifting business practices, for example by possibly disincentivizing contractors from marketing PACE, than with a filtering-out of consumers who cannot afford to repay a PACE loan." As stated above in what ARC should consider (i.e. whether conclusions follow from the analysis), the authors need to do more analysis before making a conclusion of unfair practice based on their evidence.
6. It would be useful for the authors to attempt to quantify costs and benefits of the CA policy. The **benefit** of the CA policy was a decline in delinquencies. But what about the **cost** that certain borrowers were shut out of the market?

Reviewer 4

1. Took loan vs. approved but didn't take (people who found a better credit option and probably have better credit scores – need balancing on baseline credit characteristics). Table 3 characteristics suggest that propensity score matching or weighting is necessary and would result in less biased outcome estimates – especially an adjustment for prior mortgage delinquency. If anything, it may be that mortgage delinquency outcomes are underestimated in this regard as applicants had higher prior delinquency.
2. In terms of selection bias re: the decision to originate PACE loans, it seems that prior mortgage delinquency should be included in the regression analysis, especially because you prior delinquency is a behavioral determinant that could very well predict a future similar, credit-related behavior (origination).
3. I don't see how the estimated impact of PACE loans on mortgage delinquency isn't simply related to taking on more credit and increasing DTI. It seems a true counter-factual would be approved applicants who did not originate a PACE loan but did originate a HEL or HELOC, with a viable assumption being that having considered a PACE loan, the reason for the HEL or HELOC was the same or very similar to the PACE loan in terms of the home improvement project. Similarly, I don't think the Denied consumers analysis offers anything in terms of a counterfactual. The important thing is to isolate the effects of PACE loans with respect to the use of other credit options for similar purposes, otherwise the impact you are estimating is likely due more to overall indebtedness than the structural and price features of a PACE loan. In this sense, the DiD framework holds up with respect to parallel trends, but it's impossible to characterize the exogenous event as the PACE loan specifically vs. a higher level of indebtedness and higher DTI, whereas both of these factors predict delinquency. To the extent that PACE loans then are just a proxy for higher indebtedness and DTI, the consumer is making a clear trade-off: taking on more debt which risks delinquency, yet receiving economic returns with respect to energy savings and possibly increased property value. Again, this is where a HEL/HELOC counterfactual would be very helpful – in the presence of these tradeoffs, you could isolate the extent to which PACE loans increase delinquency risk.
4. PACE loans can't cause increases in credit card balances who did not have a pre-existing mortgage – the underlying behavior is the same for both forms of credit. There's no viable causal mechanism for how the use of one form of credit would cause a consumer to use another form of credit (report says that people with problems repaying PACE turned to credit cards – very weak assertion). There could be myriad reasons the two are correlated with respect to consumer circumstances. A likely culprit is home improvement expenses that exceed the PACE loan amount – the total cost of the project is simply spread across two or more sources of credit (especially if PACE loans cannot be used for certain purposes). Those without pre-existing mortgages probably have older homes that require more extensive improvements. For potential energy and water savings, this would certainly be the case, such as replacing cast iron pipes, insulating homes built before 1940, which were rarely insulated, and/or replacing original windows.
5. Effects on property tax bills? This is misleading because the increase is related to loan repayment. This conclusion implies a dramatic rise in actual property tax. The statement on page 13: "This means that on average a consumer's total property taxes likely increased by almost 88 percent as a result" seems to be factually incorrect. The property tax *bill* increased by

this much, but this is due to loan repayment. To examine impacts on actual property taxes you would need to see how actual taxes increased based on assessed property value which may increase over time due to the improvements, yet such an increase in assessed value and hence taxes would be the same regardless of how the improvements were financed.

6. Should compare rates on PACE loans to Home equity loans (HELs) and lines of credit (HELOCs), averages for which are right in line with PACE rates. Similarly, the assertion on page 14 that “...the PACE loans in our data were relatively expensive relative to primary mortgages” is certainly also true for HELs and HELOCs and is time variant – comparing two interest rates at two different points in time as affected by prime lending rates which are affected by the federal funds rate set by the Fed. In general, a clearer and stronger case should be made for how PACE loans are more expensive than HELs and HELOCs which would strengthen the case for how and why PACE industry practices are problematic relative to the HEL and HELOC market. This helps support the probable finding on page 28 that super-prime scores predicted lower PACE origination due to having more credit options, though I don’t think prime and near-prime consumers are locked out of the HEL and HELOC markets.
7. It’s not clear how on pages 18-19 the data on changes in mortgage payments illustrate anything of value – these data simply reflect the choice to use more credit via PACE loans vs. the choice to not. Yes, mortgage payments rise dramatically, but this is simply due to bundling servicing on two forms of credit unless you can demonstrate how these bundled payments would be greater than what would be expected of a mortgage + HEL payment. I think it’s better to focus on the implications of the bundling with respect to mortgage delinquency – PACE loans are structurally risky for mortgage delinquency because most mortgage servicers include property tax payments (and hence, PACE loan payments) in mortgage payments. In this sense, it is structurally more risky than separate mortgage and HEL payments. This helps with interpretation of main results in terms of identifying a causal mechanism vs. how PACE loans are more expensive than HELs/HELOCs which I think might not be the case.
8. There’s no mention of the Inflation Reduction Act anywhere in the report but it seems very relevant with respect to the home energy rebates and tax credits as a new source of financing that seemingly would reduce demand for PACE loans.
9. Figure 3 on page 19 has a misspelling – “Applicantion-only”

Reviewer 5

1. I found it a bit odd that this study primarily examines the borrower’s characteristics, rather than also assessing the house’s features. Based on my reading of the report and the PACE program, this is a home improvement loan. Are we to infer that the quality of the house is correlated with borrower’s demographic characteristics? Age and neighborhood characteristics, I would gather are informative.
2. I would have liked some additional information on the origins of the program, why does the loan get paid back through property taxes. Can the contractor refuse to accept payment this way and that be an additional reason why an approved loan never gets used?
3. The analysis indicates that these loans can contribute to financial hardship by increasing property taxes. Could there be more explanation on the benefits of these loans, more specifically, how does the payment method (via property tax) help the homeowner? Presumably, if these homeowners could have paid for the repairs outright or through other

credit mechanisms, they would not have taken on out a loan. Why would this option be attractive?

Reviewer 6

Major comments

1. The study's core finding suggests that Property Assessed Clean Energy (PACE) financing results in higher delinquency. However, this isn't surprising given that increased debt naturally corresponds to higher delinquency rates. The crucial question should focus on the purpose of PACE financing - does it serve its intended function by enhancing home value proportionate to or exceeding the investment made? Therefore, it's critical to examine if PACE financing has been utilized for projects with positive Net Present Value (NPV), leading to increases in home prices commensurate with the loan taken.
2. What seems to be missing from the analysis is an exploration of homeowners who used PACE to upgrade their homes and subsequently sold them at higher prices. Moreover, the treatment of home sales and PACE loan repayment in the analysis remains unclear and needs elaboration.
3. The comparison of PACE costs to mortgage costs appears misguided, as these loans differ in their seniority levels. A more appropriate benchmark would be a Home Equity Line of Credit (HELOC) or a Home Equity Loan.
4. The authors can leverage a compelling experimental dimension present in this study. In California, property taxes are based on the real purchase price, while in Florida, homes are reassessed annually. This differential can be utilized to show, for instance, how PACE-funded improvements increase property taxes in Florida but not in California, making PACE financing indirectly more costly in Florida. Consequently, one would anticipate a greater increase in delinquency rates in Florida compared to California due to PACE. There is much information online on this, e.g.: <https://lao.ca.gov/reports/2012/tax/property-tax-primer-112912.aspx>, <https://floridarevenue.com/property/Documents/pt107.pdf>.
5. Revisiting the economic perspective: any additional borrowing, including PACE, is likely to augment delinquency. But does PACE escalate delinquency more than other forms of debt of the same magnitude?

Minor comments:

1. The document delves deep into details without offering sufficient economic interpretation or rationalization. For instance, Table 1 occupies a significant portion of the report yet lacks a meaningful interpretation. The Data section should be concise, focusing on the main takeaways in a single table. Additional details can be included in an appendix.
2. Tables 2 and 3 both present loan statistics with an apparent discrepancy between the average original balance and the average amount requested. Is it common for borrowers to receive larger loans than requested, and if so, is it legal? Is there a differential contribution to delinquency rates between the requested amount and any additionally approved amount?
3. In Figure 9, it's unclear why the baseline isn't set at $t=0$.
4. The current regression analyses have error clustering at the applicant level. Consider two-way clustering by applicant and month and the possibility of incorporating state or zip code fixed effects.
5. The study can be improved with respect to user-friendliness. Here are some examples:

- Include the number of observations in Table 7.
- Make the interesting aspects more prominent. For instance, the material on page 26 could be presented earlier, say on page 7, moving everything else to the appendix.
- Ensure charts are compatible with black and white printing.