It Takes Two to Borrow: The Effects of the Equal Credit Opportunity Act on Homeownership and Mortgage Debt of Married Couples*

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Abstract

Until the 1970s, U.S. mortgage lenders commonly discounted the wife's income in couples' joint mortgage applications. This changed with the introduction of anti-discrimination legislation in the 1970s. The Equal Credit Opportunity Act (ECOA) of 1974 prohibited credit discrimination related to marital status and sex, providing a natural experiment to study the relaxation of income-related borrowing constraints. Despite its far-reaching consequences for lending practices, the ECOA's effects on female access to credit have remained an open question. I examine the effects of the reform based on data from the Panel Study of Income Dynamics, and find positive effects on mortgage borrowing and homeownership rates of married households with working wives. The difference-in-difference results at the national level are supported by event study regressions exploiting variation in hand-collected state laws. My results imply that upon its introduction, the new equal credit opportunity legislation enabled 1.4 million couples to move into their own home. I further built a life-cycle model of married households' homeownership and mortgage choices to explore the labor supply incentives of relaxing debt-to-income constraints via the creditable share of the wife's labor income. The model shows that the reform incentivized married women to join the labor force, strongly amplifying the positive effect on married couples' homeownership in the medium to long run.

JEL codes: E21, J16, J18, N32, R21, R38

Keywords: household debt, female access to credit, equal credit opportunity, credit constraints

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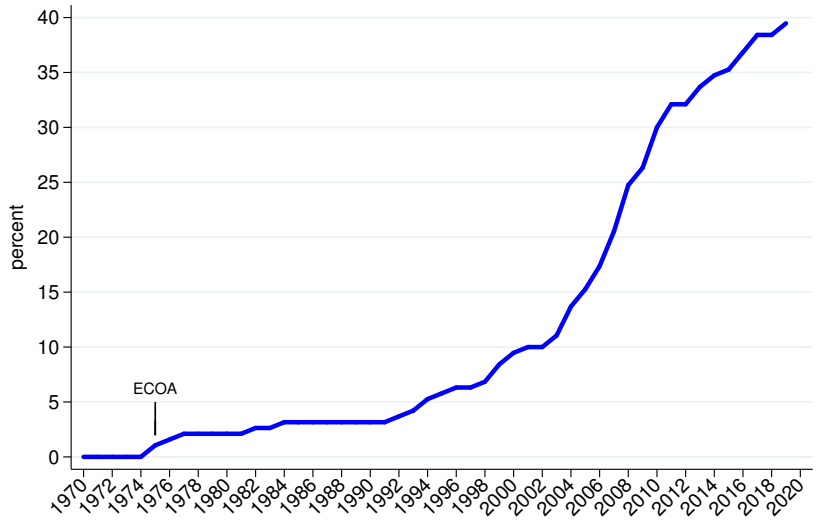
1 Introduction

Access to credit is an essential part of the economic lives of millions of Americans. Yet only half a century ago, this access was restricted for a substantial share of the United States' citizens. Until the 1970s, discrimination in credit transactions based on characteristics like sex, marital status or race was widespread and institutionalized. Among women, especially those who were married faced severe restrictions. For instance, they could hardly obtain credit in their own name. Moreover, it was common to discount the wife's income by 50% when a couple jointly applied for a mortgage, or to even completely disregard it (Kendig 1973). This is of particular importance because mortgage debt is the dominant form of household debt, accounting for about 80% of total household borrowing (cf. Bartscher et al. 2020). Female labor force participation had increased substantially since the 1950s and kept rising, particularly among married women (Juhn and Potter 2006). With stable female employment becoming more and more common, the established practice of income discounting increasingly failed to live up to married couples' reality of life.

Given the relevance of borrowing, and in particular mortgage debt, for economic participation and consumption smoothing, it is important to understand the effects of legislative attempts to lift restrictions in access to credit. In the early 1970s, not a single country in the world had a law that explicitly prohibited gender-based discrimination in credit access (see Figure 1). This changed in 1974, when the Equal Credit Opportunity Act (ECOA) was passed in the United States. It became effective in October 1975, when the regulations for its implementation were published (Smith 1977). The new law precluded discrimination in lending based on sex and marital status, including the practice of income discounting. It thus constitutes a natural experiment to study if and to what extent the relaxation of income-related borrowing constraints affects households' access to homeownership and mortgage credit.

While the macroeconomic literature has mainly focused on loan-to-value constraints to model frictional financial markets, income-related borrowing constraints have only recently gained more attention (Greenwald 2018). I apply difference-in-difference and event study techniques to show that the ECOA had sizable and significant positive effects on the homeownership rate and mortgage borrowing of married couples with working wives. These results provide clear evidence in support of the importance of debt-to-income constraints. Moreover, I use a theoretical life-cycle model to study the interactions between households' behavior in the mortgage market and women's behavior in the labor market. By increasing the creditable share of married women's incomes, the ECOA raised women's returns to working. I find that the labor supply incentives of the act were powerful enough to motivate women to join the labor force. The increased labor force participation in turn strongly amplifies the positive effects on homeownership and borrowing.

Figure 1: Laws prohibiting discrimination in access to credit based on gender



Notes: The graph shows the share of countries that have explicit laws prohibiting discrimination in access to credit based on gender in a sample of 190 economies. Note that the ECOA applied to Puerto Rico as well. Data source: World Bank Women, Business and the Law (WBL) database.

Although the ECOA required creditors to profoundly change their lending practices (Smith 1977), its effectiveness in increasing women's access to credit have remained an open question. Elliehausen and Durkin (1989) provide theoretical arguments why they think the ECOA did not increase credit availability "to anyone", whereas Ladd (1982) and Haurin and Kamara (1992) provide suggestive empirical evidence pointing to the contrary. However, none of these studies conducts a comprehensive econometric analysis of the topic.

In the empirical part of the paper, I attempt to fill this gap by analyzing data from the Panel Study of Income Dynamics (PSID). In particular, I exploit the institutional setting to estimate difference-in-difference regressions at the federal and event study regressions at the state level. My main focus is on married households with working wives. Since the ECOA ended the practice of income discounting, my hypothesis is that households with a higher income contribution of the wife could benefit more from the new law. I therefore compare households with a higher to those with a lower female income contribution (first difference) before and after the reform (second difference).

My results show that subsequent to the ECOA, the increase in mortgage-to-income ratios was higher the more the wife's earnings had contributed to total household income in the pre-reform years. During the pre-reform period, there was no difference in mortgage-to-income ratios depending on the wife's income share. The effect on mortgage debt is mainly driven by the extensive margin, i.e. by a higher relative share of households holding a mortgage. Additionally, I find a relative increase in homeownership, which entails increases in housing-to-income ratios and home size. The relative increase in home size mostly stems from households moving from smaller rented to larger owned

properties. My estimates imply that the introduction of legislation against gender-based credit discrimination allowed 1.4 million of married households to move to an own home, and 1.8 million to take out a mortgage.

The first congressional hearings on equal credit opportunity for women, which finally led to the passage of the ECOA, took place in 1972. Appendix Figure A.4 provides graphical evidence on how attention for the topic "women and credit" surged from 1972 on, based on data from the Google Books Ngram Viewer. Against this background, I use 1971 as the last pre-reform year in the federal-level difference-in-difference regressions. Another important aspect is that several states already introduced equal credit opportunity laws on their own initiative in the interim period between the first congressional hearings of 1972 and the effective date of the ECOA at the federal level in 1975 (U.S. Department of Labor 1975).

An advantage of this interim period is that it allows me to exploit state-level variation in an event study design. For this purpose, I collected information on the respective state laws. While the national-level difference-in-difference design (in its most basic form) relies on a comparison of households with and without a working wife within a state, the state-level event study design estimates the effect of the ECOA by comparing households with a working wife in states which have already implemented an anti-lending-discrimination law to similar households in a states which have not. Importantly, the results corroborate the national-level evidence based on state-level variation. While the structure of the data does not allow me to run the event-study regressions with mortgage debt as the outcome (see discussion in Section 3), I find positive and significant effects on homeownership, house size and housing-to-income ratios of married couples in treated relative to untreated states after the reform, whereas there were no significant differences during the pre-reform years.

The state-level regressions are unlikely to pick up other contemporaneous events, given that these would have to coincide geographically and temporally with the introduction of the state-level laws. However, the national-level difference-in-difference estimates might, despite being consistent with plausible effects of the ECOA, still capture other contemporaneous events. For instance, the Vietnam War ended in the early 1970s, and U.S. veterans could obtain advantageous mortgage conditions due to insurance by the Department of Veterans Affairs (VA) (Foote and Peterson 2008). I therefore conduct a battery of robustness checks for the national-level regressions to minimize the risk that my results are driven by confounding events.

On impact, the new legislation was most beneficial for households in which the wife had already been working, as lenders were still allowed to take employment continuity into account when determining mortgage eligibility (Geary 1976, Cairns 1976). However, the ECOA may have increased the labor supply incentives for women in new entering cohorts of (prospective) homeowners. There are two opposing effects on female labor supply. On the one hand, the wife ceteris paribus had to work less after the reform to afford

a mortgage of a given size. On the other hand, the return to labor supply in terms of borrowing capacity increased with the reform, providing positive work incentives. In order to examine the potential labor supply effects, I build a life-cycle model of married households' homeownership and mortgage choices, drawing on previous work by Pizzinelli (2018), Attanasio et al. (2012), Druedahl (2015) and Bottazzi, Low, and Wakefield (2007). Households can choose whether to rent or own a house. If they opt for ownership, they can borrow against their house up to the minimum of a loan-to-value (LTV) and debt-to-income (DTI) constraint. I calibrate the model to the early 1970s, and simulate it under the assumption that either 50% or 100% of the wife's labor income can be counted toward the mortgage.

The results show that the ECOA was powerful enough to encourage married women to join the labor force. Under the given calibration, an increase in the female income discounting factor from 50% to 100% entails an increase in the female labor force participation (FLFP) rate of 2 percentage points. The additional labor supply of the women approximately doubles the effect on married couple's homeownership. The effects are strongest for young households, consistent with the empirical fact that households typically buy their first home home before their mid-thirties. Moreover, the effects are stronger for households with in which the husband earns less than the median male income. This is in line with the data, where the effects on homeownership and debt are stronger the more the wife (and thus the less the husband) contributes to the household's income. While the new equal credit opportunity legislation already had sizable positive effects on married couple's homeownership upon its introduction, the model suggests even bigger medium- to long-run effects due to the amplification via increased FLFP, because the number of households benefiting from the possibility to count the wife's income toward a mortgage increased with more women entering the labor force.

My work is related to different strands of literature. First, it contributes to the literature on women's financial rights and decisions. For instance, Hazan, Weiss, and Zoabi (2019) find that the extension of married women's property rights to movable property in the U.S. since the 1850s induced significant shifts in household portfolios. Goldsmith-Pinkham and Shue (2020) show that even today, housing wealth is associated with gender differences in the U.S. They find that single women earn substantially smaller returns on housing compared to single men, while couples range in between. The authors name differences in market timing as an important explanation, but also point to the possibility of discrimination in negotiations.[1] My research shows that granting women the same rights as men in mortgage applications has important both on household balance sheets and wives' labor supply decisions.

My paper also adds to the literature on home financing, the role of debt-to-income con-

[1]However, Andersen et al. (2020) argue based on Danish data that the return difference between single men and women can be entirely explained by individual and property characteristics, which are not available in the U.S. data of Goldsmith-Pinkham and Shue (2020).

straints and their interaction with female labor supply. A relaxation of LTV constraints allows households to borrow more against their house. Since additional borrowing can be used to cushion idiosyncratic income shocks (Braxton, Herkenhoff, and Phillips 2020, Herkenhoff, Phillips, and Cohen-Cole 2020), the incentive for female labor supply is reduced, as there is less need to provide insurance against negative male income shocks (cf. Attanasio, Low, and Sánchez-Marcos 2005). By contrast, a loosening of DTI constraints has opposing effects on labor supply, as mentioned above. Empirical papers have found negative effects of relaxed LTV constraints and increased credit supply on female labor supply (Kumar and Liang 2019, Del Boca and Lusardi 2003, Dao Bui and Ume 2020). In contrast, women in households with larger mortgages, or households being closer to the debt-service constraint based on other than female labor income, have a higher probability to participate in the labor force, and tend to work more (see, e.g., Fortin 1995, Atalay, Barrett, and Edwards 2016 and Appendix Table A.1). Causality can run in both directions, as housing, mortgage and labor supply choices may be determined jointly (Kohlhase 1986, Atalay, Barrett, and Edwards 2016). My results show that a relaxation of income-related borrowing constraints which directly operates on the creditable share of the wife's income has the potential to motivate women to join the labor force, and that the increased labor force participation amplifies the positive direct effects of relaxing the constraint on homeownership.

The ECOA paved the way for similar laws in many countries around the world, which are collected in the World Bank's Women, Business and the Law (WBL) database. Figure 1 shows that today, 40% of the 190 countries in the WBL panel have explicit laws against female credit discrimination. This however also implies that female access to credit is still not explicitly legally protected in more than half of the world's countries. While this does not necessarily mean that women suffer credit discrimination in all these countries, it still suggests there is scope for improvement. This may be particularly true for developing countries (see also Hyland, Djankov, and Goldberg 2020).[2]

Previous research has shown that strengthening women's financial rights in developing countries can have positive economic and social effects. For instance, Field et al. (2019) find that providing Indian women with access to their own bank accounts induces them to increase their labor supply, and exerts a positive influence on gender norms. Furthermore, discrimination in lending has recently regained attention also in developed countries due to the increased usage of algorithms and artificial intelligence in lending decisions. Such algorithms can be biased by human decisions in the process of their design, and their complexity can make it harder to detect violations of anti-discrimination laws (Morse and Pence 2020), which puts new emphasis on the importance of equal access to credit.

[2]Only seven OECD countries did not have explicit laws against gender-based credit discrimination by 2019. Out of these, five rank below the average in the Economist's "Glass Ceiling Index", which compares 29 OECD countries with respect to women's chance for equal treatment at work. Among them are South Korea, Japan, Turkey and Switzerland, which occupy the lowest echelons in the ranking.

The paper is structured along the following outline. First, I will retrace the historical context of the ECOA in Section 2. After briefly describing the data in Section 3, I will present the empirical results in Section 4. Section 5 looks at the labor supply incentives of the act based on a theoretical life-cycle model. Section 6 concludes.

2 Historical context

I will start with a short recapitulation of the events leading to the passage of the ECOA. Moreover, I will give a brief overview of the ensuing debate about the laws effectiveness.

2.1 Women and credit in the U.S. until the 1970s

Until the 1970s, American women faced various difficulties if they wanted to borrow money. The obstacles they encountered are documented in the Report of the National Commission on Consumer Finance (1972). Single women were often unable to obtain credit, especially mortgages. Lenders commonly denied them credit in their own name, or at least required a (male) cosigner. For married women, it was even more difficult to borrow. As Cairns (1976, p. 967) puts it, married women had "greater difficulty in obtaining credit than [...] any other women".

Upon marriage, women could be required to re-apply for credit, often only under their husband's name. When a couple jointly applied for credit, it was a common practice to discount the wife's income. In certain cases, her income was not counted at all, e.g., if the marriage had lasted for less than five years, or if the couple was of young age (Kendig 1973). Income discounting was especially common if the wife was of "childbearing age" (see also Ladd 1982). Women could be required to sign an affidavit that they were practicing birth control and would not have any more children in order to get a mortgage (Kendig 1973, Cairns 1976). Lenders could even ask for a written confirmation of this from a medical practitioner, known as a "baby letter" (Geary 1976). Many creditors applied stricter standards for applications if the wife, instead of the husband, was the main wage earner (Cairns 1976).

It is hardly surprising that women perceived practices like the "baby letter" as a violation of their privacy. Moreover, women complained about economic disadvantages entailed by the described lending practices. For instance, mortgage credit can provide access to better jobs, education and health facilities by providing the opportunity to move to a different neighborhood. The historian Louis Hyman (2012) emphasizes the importance of credit for women from the upper-middle class as an "indispensable foundation of their economic and social lives" (Hyman 2012, p. 191). Yet credit in the 1970s was not only important for well-off households, but rather a "necessity for all" (Cuomo 1981, p. 126).

While the prevailing lending practices entailed economic disadvantages for women and their families, the economic justifications for maintaining them were less clear. In the 1970s, persistent female employment had become much more prevalent than in the post-war years. The female labor force participation rate had increased from around 33% in 1948 to around 45% in the early 1970s, and kept rising (see Appendix Figure A.1). This trend was mostly driven by married women (Juhn and Potter 2006). A large literature has identified important catalysts of this trend, including structural change and associated shifts in skill demand and skill premia, more favorable working conditions, legal and normative changes, as well as the increased availability of contraceptives and time-saving household appliances (see, e.g., Costa 2000, Juhn and Potter 2006, Greenwood, Seshadri, and Yorukoglu 2005 and references therein).

Of course, women still left the workforce due to pregnancy, but they also returned in increasing numbers (Lally 1974). Importantly, Lally (1974) points out that it would hardly be rational for a woman to leave the labor force to take care of her child if this would lead to a default on the mortgage with the consequent foreclosure.[3] In line with this reasoning, Fortin (1995) shows with Canadian data that women are more likely to work if their household would approach the debt-service constraint without their income. In Appendix Table A.1, I show that a similar pattern emerges for U.S. households in the 1970s. I aslo estimated event study regressions with annual hours worked and labor income as the outcome, and the purchase of a home after renting as the event. The results in Appendix Figure A.2 suggest that married women even slightly increase their hours worked and labor income after a home purchase, and their average labor income follows a similar trajectory as that of their husbands.

Already at the time of the ECOA's passage, economic studies provided evidence that women are on average no worse, or even better, credit risks than men (see, e.g., Lally 1974, Cairns 1976). Kendig (1973, p. 1) concludes that there was "no economic justification for automatically discriminating against women applicants for mortgages". A group of 180 economists even signed a "Statement of Economists" against the "[a]rbitrary exclusion of persons who have the economic capacity to participate in the [mortgage] market place".

The Federal Housing Administration (FHA) had already decided to count the income of most working wives in support of a mortgage as early as 1965, acknowledging that more and more wives were participating in the labor market.[4] However, changes in norms and attitudes can take time. Fernández (2013) shows for the United States that the approval rate of married women going to work closely followed the S-shaped profile of married womens' LFP over time. She develops a model in which intergenerational learning gives

[3]Diamond, Guren, and Tan (2020) show that foreclosures do not only entail substantial financial, but also non-pecuniary costs, and that these are disproportionately borne by the households losing their home.

[4]In 1964, Title VII of the Civil Rights Act (Public Law 88-352) had outlawed employment discrimination based on race, color, religion, sex and national origin. The market share of the FHA was around 16% in the 1960s, reached a short-lived peak of 24% in 1970, and then fell to around 7% in the mid-1970s (Golding, Szymanoski, and Lee 2014).

rise to cultural change, which initially evolves slowly and then accelerates. In line with this reasoning, it took time until all FHA field office personnel and local lenders became aware of the changes and implemented them (cf. Thurston 2018). Other important market participants, e.g., the Veterans Administration (VA), the Government-Sponsored Enterprises (GSEs) and commercial mortgage lenders, continued to commonly discounted the wife's income until the 1970s (Kendig 1973).

In 1972, attempts toward more equal access to credit gained momentum. The Federal National Mortgage Association (Fannie Mae) had abolished previous guidelines that recommended to discount a working wife's income by 50% in December 1971, and prohibited discrimination based on race, color, religion, sex, age or national origin (Kendig 1973). The above-mentioned "Statement of Economists" was signed in March 1972, and the Equal Rights Amendment to the Constitution, which would have made discrimination against women in mortgage lending unconstitutional, was approved by the U.S. Senate in the same month.[5]

In May 1972, the National Commission on Consumer Finance held congressional hearings on the availability of credit to women. In response to the hearings and the commission's recommendations, several states already enacted laws banning discrimination on the basis of sex or marital status in the subsequent years (see Table B.3). At the federal level, the ECOA was signed into law in October 1974 (Smith 1977). It required "that financial institutions and other firms engaged in the extension of credit make that credit equally available to all creditworthy customers without regard to sex or marital status" (Public Law 93-495, Title V, §502). The Board of Governors of the Federal Reserve System was mandated to write regulations for the implementation of the act, leading to the publication of the "Regulation B" in October 1975, the month the ECOA had been scheduled to become effective. Importantly, the ECOA prescribed substantial penalties for violations[6], which were perceived as "adequate to sufficiently deter creditors from willful violations" (Smith 1977, p. 610). In 1976 , the act was amended to include discrimination for any purpose (Public Law 94-239), effective in March 1977 (Smith 1977).

2.2 The debate about the ECOA's effects and effectiveness

After the enactment of the ECOA, a debate ensued about its effectiveness in extending women's access to credit. Some researchers argued that the act might actually exacerbate households' difficulties to obtain credit if lenders passed on the costs of compliance, for example costs for legal counsel, training of staff or the provision of new application forms (cf. Smith 1977). Smith (1977) reasons that if women are ceteris paribus better credit risks

[5]However, it later was not ratified by a sufficient number of states, and finally failed in 1982 (Kendig 1973, Gladstone 2004).

[6]The penalties allowed for up to 10,000 dollars in punitive damages in individual and 500,000 dollars or one percent of the creditor's net worth in class actions, plus attorney costs and legal fees.

than men, the prohibition to use sex and marital status as predictors in lending models might *decrease* their chances to obtain credit (see also Elliehausen and Durkin 1989). However, Hyman (2012) documents that lending was still hardly based on statistical analysis in the early 1970s. Lenders would commonly apply point systems, assigning, e.g., one point for singles and two for married households (Lally 1974). Hyman (2012, p. 191) writes: "While limited numeric systems existed, these were rarely based on detailed statistical analysis. Loan officers' everyday prejudices and assumptions more decisively determined credit eligibility." While some lenders already used some form of credit scoring, it was neither widespread nor very elaborate yet (cf. Cairns 1976, Exler and Tertilt 2020).

In the case of married couples jointly applying for a mortgage, some observers were worried that households relying on male and female income might still be more risky borrowers than similar households relying on the husband's income alone (cf. Lally 1974). However, the ECOA only prohibited to discount the wife's income *merely* because she was female. It was still allowed to consider aspects like the probability of employment continuity (Geary 1976, Cairns 1976). If they had valid economic reasons to expect a couple to be more risky, lenders could demand higher interest rates (cf. Agarwal et al. 2020). Yet married couples with and without a working wife paid very similar interest rates after moving to a new home both before and after the ECOA. This remains true when controlling for mortgage and household characteristics (see Appendix Figure A.3).

Analyzing the act from a legal perspective, Cuomo (1981) concludes that it laid the ground for more equality. However, only a few researchers have examined effects of the ECOA empirically. Based on theoretical reasoning against the existence of discrimination in efficient markets and ex-post survey data, Elliehausen and Durkin (1989) conclude that "there is little evidence [...] that the act has increased credit availability to anyone". However, the survey data they use may not adequately capture whether women faced restrictions in credit availability prior to the ECOA, as the questions were asked several years after the first efforts against credit discrimination, and were by default addressed to the husband, as discussed in Appendix E.

Ladd (1982) uses mortgage application data from California and New York for the years 1977 and 1978 to investigate the prevalence of discrimination against women after the ECOA. Overall, she concludes that the ECOA had a positive impact on female access to credit, whereas it was less successful for other protected groups such as racial minorities. She suggests that the relative success of the ECOA in providing credit access to women may be due to the "rapidly changing role of women in the labor market" (ibid., p. 170; cf. also Hyland, Djankov, and Goldberg 2020). Yet as she does not have pre-reform data, she cannot directly compare the extent of discrimination before and after the ECOA. Haurin and Kamara (1992) take a step in this direction with data from the National Longitudinal Surveys of Young and Mature Women from 1972/73 and 1982/83. They find that the homeownership rate increased between the two survey dates for married

women and singles, conditional upon household characteristics, and argue that this is in line with positive effects of the ECOA.

In summary, there is suggestive evidence that the ECOA might have had important positive effects on married women's access to credit, but formal econometric evidence is missing. In the following, I will explore the effects of the ECOA in a difference-in-difference design. I will use data from the PSID, which allows me to track the same households over time, and to include pre-reform characteristics in the estimation.

3 Data

The PSID is a widely used representative survey of U.S. families. It was conducted at an annual frequency between 1968 and 1997, and has been continued at a biennial frequency since then. In order to obtain household-level data, I aggregated PSID families who are living together into one household (cf. Pfeffer et al. 2016). Following Kaplan, Violante, and Weidner (2014), I use data from the PSID's "Survey Research Cente (SRC) sample", which tracks the original households from the first PSID wave over time, as well as the new households formed by former members of these households, e.g., adult children moving out. I use the longitudinal family weights provided on the PSID homepage and post-stratify them to match age, race and homeownership from the Current Population Survey (CPS), following the procedure of Kuhn, Schularick, and Steins (2020).[7] All nominal variables were deflated with the CPI (obtained from the *Macrohistory Database*, Jordà, Schularick, and Taylor 2017), such that the reported results are in 2016 dollars.

Before the ECOA, women's access to credit was restricted both for secured and unsecured debt. Comprehensive information on wealth is available in the PSID only since 1984, and was initially only queried every five years. Questions on components of personal debt like student and credit card debt are only available since 2011. However, the majority of household debt in the U.S. consists of housing debt (Bartscher et al. 2020). Information on the outstanding mortgage balance is available in the PSID since 1969, as well as information on monthly mortgage payments. Unfortunately, both of these variables are missing forP 1973-1975 and 1982. Information on the asset value of houses and their size is available without interruptions since 1968. Moreover, the survey provides information on the labor income of household heads and spouses, as well as total household income. Additionally, it contains a wide range of demographic variables, such as age, number of children and state of residence.

For some complementary results, I also use data from the "SCF+". This data set combines the modern Survey on Consumer Finances (SCF) with its historical predecessors. Kuhn, Schularick, and Steins (2020) describe this data source in detail.

[7] In principle, the "SRC sample" can even be used without weights (see, e.g., Kaplan, Violante, and Weidner 2014 and the PSID documentation). My results do not critically depend on using the weights.

4 Effects of the ECOA

As discussed in Section 2.1, married women arguably had the greatest difficulties of all women to obtain access to credit prior to the ECOA, in particular regarding mortgages. Moreover, even if the share of single households living in an owned and mortgaged property increased after the mid-1970s, it was still comparatively small (see Figure A.5 in the Appendix). Therefore, I will focus my analysis on married households. To guide the analysis, I give a brief theoretical background before proceeding to the empirical results.

4.1 Some brief theoretical background

Let us consider a stylized model of married couples' household debt and housing choices over the life cycle. Households live from period $j = 1$ to J and consist of a male spouse m and a female spouse f who earn labor income y_j^m and y_j^f. Borrowing d_j is only possible if the household owns a house ($h_j > 0$), and is limited by the minimum of a loan-to-value (LTV) and debt-to-income (DTI) constraint:

$$\phi(h_j, y_j^m, y_j^f) = min\left\{\lambda^h p h_j,\ \lambda^y(y_j^m + \lambda^d y_j^f)\right\}. \tag{1}$$

λ^h is the LTV limit, p is the house price, λ^y is the DTI limit, and λ^d determines by how much the wife's income is discounted. Household thus have to maximize their utility subject to a budget constraint and the relevant borrowing constraint, for which there are three options: (a) the household does not own a house, in which case asset holdings must be positive; (b) the household owns a home, but the LTV constraint ($\lambda^h p h_j \geq d_{j+1}$) binds before the DTI constraint; or (c) the household owns a home, and the DTI constraint ($\lambda^y(y_j^m + \lambda^d y_j^f) \geq d_{j+1}$) binds before the LTV constraint.

λ^d only matters for the household problem if the household owns a house ($h_j > 0$) and the DTI constraint is binding. In the short run, we can think of female labor supply as sticky. Women who have not worked before would need to find a job first, which typically takes time. Adjustments in hours may not be possible on short notice, or even require a change of employer, again involving a period of search. Importantly, banks were still allowed to take employment continuity and income stability into account, such that short-term labor supply increases would not immediately translate into a relaxation of DTI constraints. Potential changes in labor supply are however likely to play a role in the medium to long run, and will be examined in Section 5. If λ^d is raised, households which were previously limited by the DTI constraint will be enabled to take out a mortgage and buy a home. The response will be stronger for households in which the wife contributes more to total household income y_j. To see this, consider a household at the DTI constraint, and take the derivative with respect to the income discounting factor λ^d:

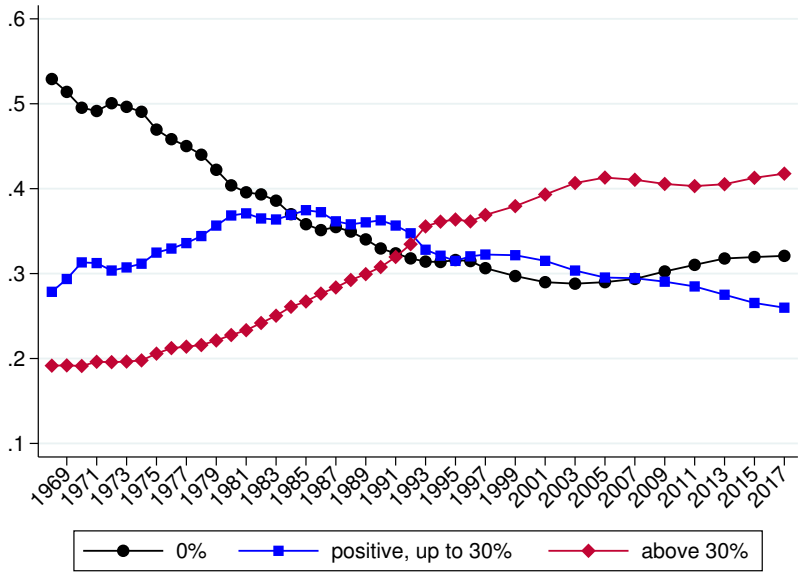
$$\frac{\partial d_{j+1}}{\partial \lambda^d} = \lambda^y y_j^f = \lambda^y s_j^f y_j > 0.$$

s_j^f denotes the share of the wife's labor income in household income y_j. The derivative shows that the household will increase its debt if λ^d increases, and the response will be stronger the higher the wife's income share is. Based on these considerations, my hypothesis is that married households in which the wife contributed a larger share to household income have increased their housing debt by more in response to the reform. As I will show in the following, the PSID data provide clear evidence in support of this conjecture.

4.2 Descriptive evidence

As discussed in Section 2, female labor force participation had increased substantially by the 1970s and kept rising, such that more and more households at least in part relied on female labor income. Figure 2 stratifies married households by the wife's contribution to the household's total income. Around 50% of wives did not contribute any earnings to their household's income in the early 1970s.[8] This share steadily declined over the following years, until it leveled off at around 30% in the late 1990s. The share of households in which the wife's earnings make a moderate contribution of less than 30% of total household income has increased slightly over the 1970s, stayed more or less constant until the early 1990s, and declined again thereafter. By contrast, the share of households in

Figure 2: Shares of married households by labor income share of wife



Notes: The graph shows household shares among all married households, stratified by the wife's labor income contribution to the total household income. Male spouses are classified as heads. The series were smoothed by taking a 3-year moving average.

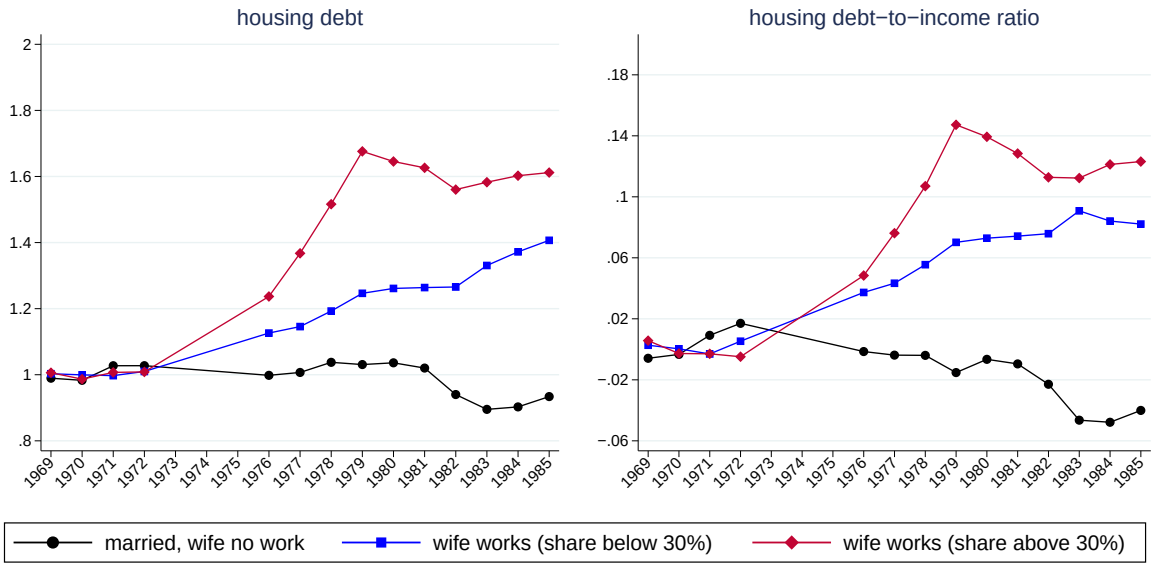
[8]This corresponds to about a third of all (married and non-married) households at the time.

which the wife's labor income accounts for more than 30% of total household income has increased considerably over time, from less than 20% to 40%.

In 1986, the Reagan Tax Reform Act introduced major changes in mortgage markets (Bartscher et al. 2020), and potentially also labor markets (Juhn and Potter 2006, Bastian 2020). Therefore, I will focus on the period until 1985 in the following, which corresponds to a period of ten years after the ECOA's effective date in 1975. Single households are excluded from the sample, and the head is defined to be the male partner in all cases. I will refer to this sample as the baseline sample throughout.

Figure 3 shows the trajectory of housing debt for the same three groups of married households. It reveals that married households with a working wife increased their housing debt more after the ECOA than married households with a non-working wife. The effect is stronger the more the wife contributes to total household income. In the right panel, I normalize housing debt with total household income to make sure that the divergences in debt levels does not simply reflect a divergence in incomes. While normalizing by income introduces some more noise, the qualitative patterns remain the same.

Figure 3: Housing debt of married households by female income contribution

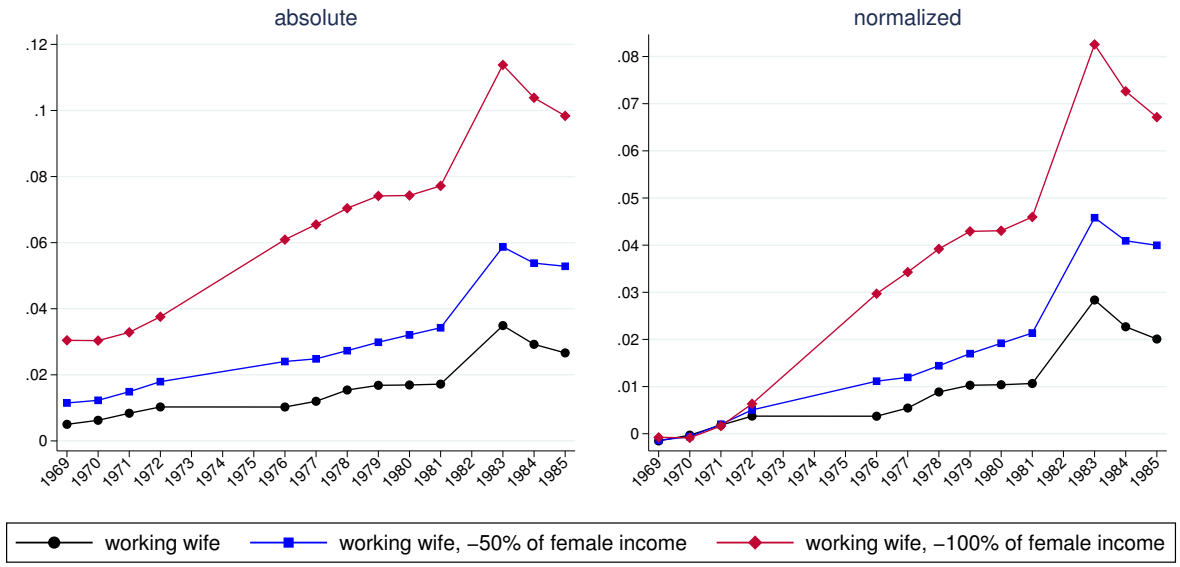


Notes: The graph shows housing debt of married households over time. It differentiates between households in which the wife's labor income accounts for different shares of total household income. All series were normalized with their average over the period 1969-1971. The left panel shows average housing debt, and the right panel shows the average housing debt-to-income ratio, after winsorizing at the 99th percentile within each year. The series were smoothed by taking a 3-year moving average.

The faster debt increase of married households with a working wife subsequent to the ECOA suggests that the possibility to (fully) count the wife's income toward a mortgage enabled married households to buy a home who had previously been restricted by debt-service constraints. After the reform, the extent to which married households relied on the wife's income for mortgage borrowing actually increased substantially. In the United States of the 1970s, banks viewed 25% of gross income as a critical threshold which

mortgage payments should not exceed upon origination (Lally 1974, Gigot 1981). Figure 4 shows the shares of married households with a working wife whose debt-service-to-income (DSTI) ratio exceeds 25%. Additionally, it shows the share of households whose DSTI ratio *would be* above 25% if 50% or 100% of the wife's income were discounted.

Figure 4: Share of households with debt-service ratio above 0.25



Notes: The graph shows the share of households with a debt-service-to-income ratio above 0.25 among households with a working wife. Households with implausibly high debt-service ratios (above the 99.8th percentile) were excluded. The blue lines with squares (red lines with diamonds) show counterfactual shares based on a debt-service ratio excluding 50% (100%) of the wife's income. The series were smoothed by taking a 3-year moving average. The left panel shows the actual shares, and the right panel normalizes each series with its average over the period 1969-1971.

Households with a working wife already relied on female income before the ECOA, as the left panel of Figure 4 shows. When the wife's income is partially or fully disregarded, the share of households with a high debt-service ratio in 1969-1971 increases from around 1% to 1.5% or 3%, respectively. However, the reliance on female income has grew substantially after the ECOA. This becomes clearer in the right panel of Figure 4, which normalizes the series from the left panel by subtracting their 1969-1971 averages. The share of households who would exceed the critical threshold without the wife's income surges rapidly after the reform, demonstrating the increased reliance on female income. More than 10% of married households with a working wife would have found themselves above the threshold without the wife's income in the early 1980s.[9] Looking at the share of households with a high DTI ratio leads to similar conclusions (see Appendix Figure A.6).

A DSTI (or DTI) constraint typically only binds upon origination of a mortgage. If it is violated at a later point, e.g., due to a short-lived negative income shock, this is usually not sanctioned, as long as the household is still able to make the mortgage payments. Hence, there is no one-for-one mapping between the share of households violating the

[9]Note that some lenders began to relax debt service restrictions in the early 1980s (Gigot 1981).

constraint and the share of households who are unable to service a mortgage. Yet Figure 4 suggests that many of the households who took out a mortgage in the period after the ECOA could not have borrowed as much without relying on the wife's income, unless the husbands would have had scope to work substantially more (see also Offer 2007).

4.3 Difference-in-difference estimates

To gain formal empirical evidence, I estimate simple difference-in-difference regressions. As discussed in the introduction, I will treat 1971 as the last pre-reform year, because the first actions toward equal access to credit for women were taken after this year. The empirical specification is as follows:

$$Y_{ist} = \sum_{t=1969,\ t\neq 1971}^{1985} \beta_t \cdot \delta_t \cdot share_i^{pre} + \gamma_i + \alpha_{st} + \Gamma' X_{ist} + \epsilon_{ist}. \tag{2}$$

Y_{ist} is the outcome variable, for instance the housing debt-to-income ratio of household i living in state s in year t. δ_t are year dummies and $share_i^{pre}$ is the average share of the wife's labor income in total income of household i over the period 1969-1971. Labor income includes wages and salaries, as well as the labor portion of other income, e.g., from businesses.[10] I use the average pre-reform income share, because it is predetermined with respect to the reform. A robustness check with contemporaneous income shares is presented below.

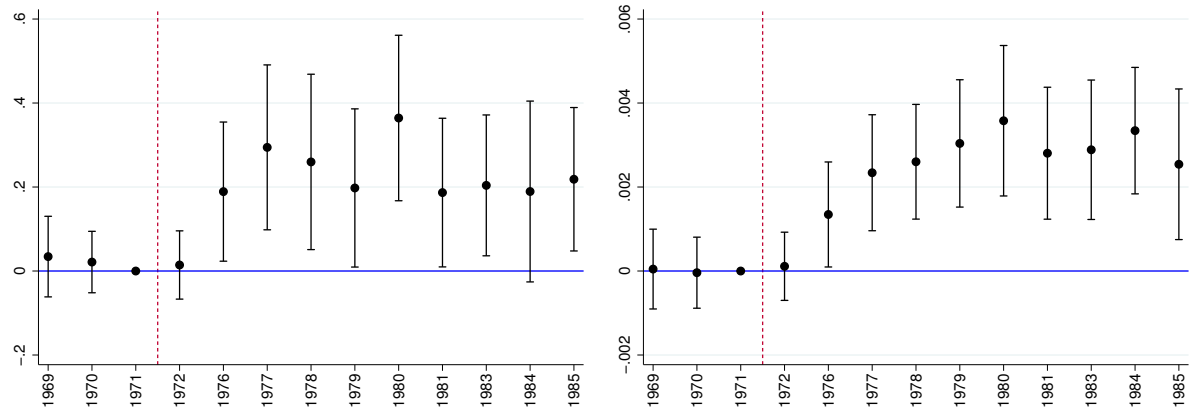
I further exploit the panel dimension of the PSID by including household fixed effects γ_i to absorb all household characteristics that are constant over time. Moreover, I control for state-year fixed effects α_{st} to absorb aggregate and state-specific trends, for example in house prices (cf. Offer 2007). X_{ist} is a vector of time-varying demographic controls. In particular, I include age group dummies and the number of children to control for life-cycle patterns, as well as income group dummies.[11] Note that the inclusion of the state-year and age dummies implicitly controls for cohort membership. Standard errors are clustered at the household and state level.

The coefficients of interest are those on the interaction term, β_t. Given the previous discussion, it can be expected that households profited all the more from the reform the more the wife contributed to the household's income. The idea is therefore to use households with a lower pre-reform female income share as a control group for those with a higher share. One may also estimate a more coarse but slightly simplified version of equation (2), using a binary indicator as the interaction variable and thus comparing households with a positive to those with a zero pre-reform female income share. I will

[10] For simplicity, I will refer to the wife's income share in the following. This should always be understood as the share of the wife's labor income.

[11] Following a common classification, I group households into three income categories, namely bottom 50%, 50th to 90th percentile and top 10%. The percentiles refer to the sample distribution of total household income.

Figure 5: Housing debt



(a) Housing debt-to-income ratio

(b) Mortgagor rate

Notes: The graph presents the coefficients on the interaction term in equation (2). The base year (omitted category) is 1971. The wife's income share and the DTI ratio are defined in percent. The DTI ratio was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

present results from this simplified version of the model below in Section 4.4, and use them to quantify the aggregate effects of the reform.

As a first outcome, I consider the housing debt-to-income ratio in Figure 6a, which plots the coefficients β_t over time.[12] Before 1971, housing debt-to-income ratios evolved similarly for all married households, no matter how much the wife's earnings contributed to total household income. Yet after the ECOA, households increased their housing debt-to-income ratios all the more the larger the wife's pre-reform income share was. The effect is persistent and remains significant at the 95% level until the mid-1980s (apart from one slightly less significant point estimate). Table 1 presents difference-in-difference point estimates obtained by replacing the year dummies in equation (2) with a dummy for the period after 1971. The point estimate for the DTI ratio in Table 1 implies that a household in which the wife's average pre-reform income share was one percentage point higher increased its housing debt-to-income ratio by around 0.17 percentage points (column 1) after the reform.[13] Correspondingly, a thirty-percentage-point increase in the wife's income share translates into a five-percentage-point (30×0.17) increase in debt-to-income, which is approximately 14% of the average in-sample debt-to-income ratio of 36.55%.

Home equity extraction only became popular and widespread in the 1980s (see Bartscher et al. (2020) and references therein). It is therefore likely that the relative increase in housing DTI ratios of households with a high female income contribution is at most partially driven by additional borrowing of incumbent owners against their home. Consistently, the effect operates through the extensive margin. This means that DTI ratios increase because more households take out mortgages, and not because existing borrowers increase

[12] Both income and housing debt might have changed in response to the reform. Appendix Figure B.6 shows that a similar pattern emerges with non-normalized housing debt as the outcome.

[13] For a comparison of regressions with and without controls, see Table B.1.

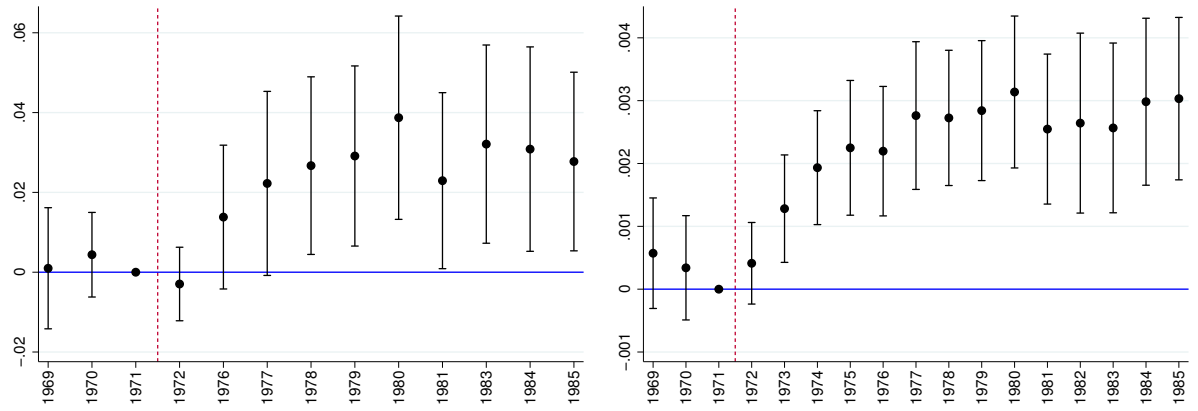
Table 1: Effects on debt: married households

	DTI	DTI, int. (log DTI)	DTI, ext. (mortgagor)	DSTI	DSTI, int. (log DSTI)
Post 1971	0.169**	-0.002	0.002***	0.018**	-0.001
× Tot. Inc. Share Wife 71	(0.070)	(0.001)	(0.001)	(0.008)	(0.001)
Controls	yes	yes	yes	yes	yes
Household FE	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes
Mean	36.548	3.915	0.513	5.092	2.100
Observations	20,188	10,225	20,190	20,188	10,222

Notes: The table presents results for equation (2), after replacing the year dummies with a dummy for the period after 1971. The abbreviations "int." and "ext." refer to the intensive and extensive margin. Standard errors are given in parentheses and are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01). The debt-to-income (DTI) and debt-service-to-income (DSTI) ratios were winsorized at the 99th percentile within each year. The wife's income share and the DTI and DSTI ratio are defined in percent.

their mortgage balance. The clear visual pattern from Figure 6b translates into a strongly significant point estimate in Table 1. According to the estimate, a one percentage point higher female income contribution leads to a 0.2 percentage points higher probability of having housing debt (column 3). By contrast, the coefficient for log housing debt relative to income in column 2, which captures the intensive margin, is small, insignificant, and actually negative. As the relative share of households with positive housing debt increases among households with a high female income contribution, the relative share of households making mortgage payments increases as well. This leads to a highly significant point estimate for the debt-service-to-income (DSTI) ratio in column 4, while there is no

Figure 6: Debt service relative to income and homeownership



(a) Debt-service-to-income ratio

(b) Homeownership

Notes: The graph presents the coefficients on the interaction term in equation (2). The base year (omitted category) is 1971. The wife's income share and the DSTI ratio are defined in percent. The DSTI ratio was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

effect at the intensive margin (column 5). Figure 7a confirms that also for the DSTI ratio, there were no pre-trends before the reform.

Absent home equity extraction, there are two other plausible reasons behind an increase in the extensive margin of housing debt. First, households may rely less on other sources of home financing, e.g., borrowing from their family (cf. Del Boca and Lusardi 2003). Second, the homeownership rate may increase. Figure 7b confirms that homeownership has indeed increased more for households with a high female income contribution. This relative increase at the extensive margin has lead to a corresponding relative increase in housing-to-income (HTI) ratios (see Figure 8a). Table 2 contains the related difference-in-difference point estimates. The average HTI ratio rises by around 0.3 percentage points more for every additional percentage point of the wife's average pre-reform income share (column 1), and the likelihood of homeownership increases by 0.2 percentage points (column 3).

Table 2: Effects on housing: married households

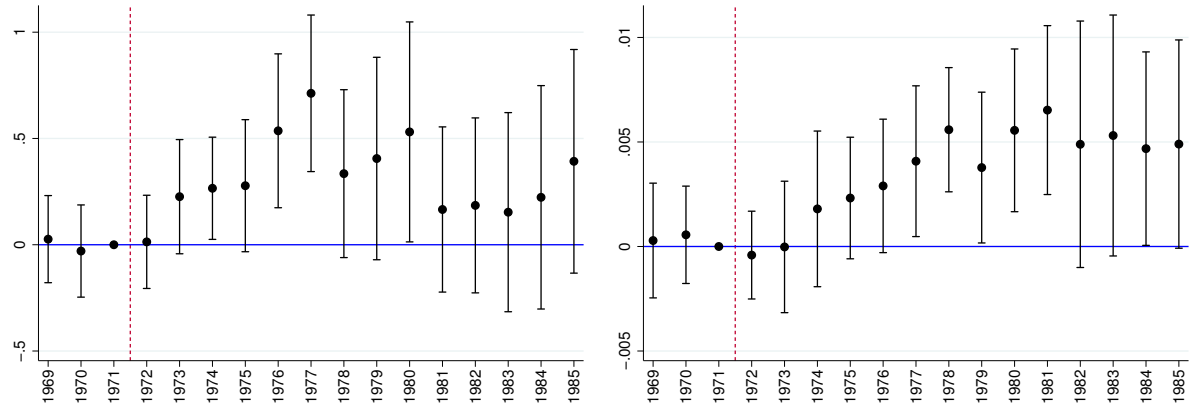
	HTI	HTI, int. (log HTI)	HTI, ext. (homeowner)	LTV	number of rooms
Post 1971	0.295**	0.000	0.002***	-0.124***	0.003**
× Tot. Inc. Share Wife 71	(0.120)	(0.001)	(0.000)	(0.036)	(0.001)
Controls	yes	yes	yes	yes	yes
Household FE	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes
Mean	157.611	5.073	0.816	25.803	5.868
Observations	26,767	21,768	26,776	16,353	26,289

Notes: The table presents results for equation (2), after replacing the individual year dummies with a dummy for the period after 1971. The abbreviations "int." and "ext." refer to the intensive and extensive margin, respectively. Standard errors are given in parentheses and are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01). The housing-to-income (HTI) and loan-to-value (LTV) ratios were winsorized at the 99th percentile within each year. The wife's income share and the HTI and LTV ratio are defined in percent.

Like the debt effect, the effect on housing mainly works through the extensive margin. The coefficient on the log housing-to-income ratio in the second column of Table 2 is positive, but very small and not significant. By construction, the loan-to-value (LTV) ratio is only defined for homeowners, and thus does not reflect changes at the extensive margin of housing. Together with the small negative effect at the intensive margin of housing debt, the small positive effect at the intensive margin of housing translates into a negative LTV effect (column 4). Finally, I find that households with a higher female income contribution increase the size of their home by more after the reform (see Figure 8b and column 5 of Table 2). This effect is mainly driven by households moving from a smaller rented to a larger owned property.[14] Some households also upgrade to larger homes, in line with the small positive intensive-margin effect.

[14]In my baseline sample, rented homes have 4.9 rooms on average, compared to 6.1 for owned properties.

Figure 7: Housing



(a) Housing-to-income ratio

(b) House size

Notes: The graph presents the coefficients on the interaction term in equation (2). The base year (omitted category) is 1971. The wife's income share and the HTI ratio are defined in percent. The HTI ratio was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

The main focus of this paper is on married households, because married women arguably had the greatest difficulties to obtain credit in the pre-reform era. However, singles may also have benefited from the reform. To investigate whether this is the case, I also estimated similar regressions for singles to examine whether their access to credit improved as well. The corresponding results are presented in Appendix C. Appendix Figure C.3 shows that singles indeed borrowed more subsequent to the ECOA, compared to married households with a non-working wife. However, there is no evidence of an associated increase in homeownership. A possible interpretation is that singles could substitute away from other financial sources, such as loans or transfers from relatives (cf. Del Boca and Lusardi 2003). Appendix Figure C.4 shows that the responses were similar for single men and single women.

4.4 Translation into aggregate effects

How do the estimated effects at the micro level translate into macro variables such as the homeownership rate? In order to quantify the effects on overall mortgage borrowing and homeownership, I replace $share_i^{pre}$ in equation (2) with a binary indicator equal to one if $share_i^{pre}$ is positive, and the year dummies with a dummy equal to one for the period after 1971. This strategy allows me to directly compute the total effect on households with working wives.[15] Moreover, the resulting estimate can be compared easily to the effect size under the alternative event study identification in Section 4.5.1. The point estimates for the extensive margin of housing debt and for homeownership are summarized in Table 3.

[15] Alternatively, I could use the point estimates from the third columns of Tables 1 and 2, and aggregate over households with different female income contributions. The resulting numbers are slightly smaller (1.15 million more homeowners and 1.3 million more borrowers).

The dynamic effects are shown in Figure B.1. The point estimate of 0.08 for the extensive margin of mortgage debt, multiplied by the average share of married households with a working wife in 1971 ($\approx$ 34.5%) and the total number of households in this year ($\approx$ 64,778,000) yields a number of 1.8 million additional borrowers. The analogous calculation for homeownership implies that 1.4 million households were enabled to buy their own home. This corresponds to a ceteris-paribus change of around 3.3 percentage points in the average the homeownership rate of married households.[16]

Table 3: Point estimates with binary interaction

	mortgagor rate	homeowner-ship rate
Dummy ×	0.081***	0.065***
Post 1971	(0.022)	(0.013)
Controls	yes	yes
Household FE	yes	yes
Time FE	yes	yes
Mean	0.513	0.816
Observations	20,190	26,776

Notes: The table presents the results of estimating a binary version of equation (2), where the interaction term is replaced by the interaction between a dummy for whether the average pre-reform share of the wife's labor income was positive and a dummy for the post-reform period after 1971. Standard errors are given in parentheses and are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01).

As discussed by Cuomo (1981), the ECOA did not abolish all credit discrimination against women. For instance, married women without an own income could still not obtain credit without their husband's approval in separate property states (ibid.) However, he acknowledges that the ECOA provided more comprehensive protection to working wives earning their own income. My results show that this increased protection translated into sizable and significant positive effects on access to credit for working wives and their households. In particular, more married households with working wives could take out mortgages to become homeowners and increase the size of their home. In the following, I will examine the robustness of my baseline findings.

4.5 State-level evidence and robustness

While the results of the national-level difference-in-difference regressions are consistent with plausible effects of the ECOA, they may still, at least partly, capture effects of other contemporaneous events that might have affected households with working wives differentially, such as the return of veterans from the Vietnam War. While I use an extensive set of robustness checks in Section 4.5.2, the institutional setup allows me to

[16] For comparison, the average homeownership rate of married households in the data changed by around 6.5 percentage points between 1971 and 1985.

provide even stronger evidence based on state-level variation. As described in Section 2.1, some U.S. states had already introduced laws against discrimination in lending before the ECOA was passed, and others passed laws in the period between the enactment and effective date of the ECOA. This setup opens up the possibility to exploit variation across states for identification. Such an approach is much more robust to potential confounding events, because these events would have to occur both in the same states and at the same time as the introduction of anti-lending-discrimination legislation. For this reason, I use information on the relevant state laws and estimate event study regressions to assess whether my previous findings are consistent with those obtained from this alternative identification. In Section 4.5.2, I then explicitly consider likely candidates for potential confounding events at the national level, and investigate the robustness of the federal-level results against the background of these events. Additional details and figures can be found in Appendix B.[17]

4.5.1 State-level variation

According to the U.S. Department of Labor (1975, p. 384), 40 states had "legislation or regulations on some aspect of discrimination in credit based on sex and/or marital status" as of April 1975. Table B.3 in the Appendix provides an overview over these laws. States which introduced anti-credit-discrimination legislation earlier might have witnessed effects on homeownership, housing debt and house sizes earlier. To test this hypothesis, I estimate event study regressions similar to the specification in equation (2)

$$Y_{ist} = \sum_{j=\underline{j}}^{j=\overline{j}} \beta^j \cdot D_{st}^j + \gamma_i + \alpha_s + \delta_{rt} + \Gamma' X_{ist} + \varepsilon_{ist}. \tag{3}$$

α_s are state fixed effects, and δ_{rt} are Census-region-times-year fixed effects. The latter are included to capture differences in house price trends across census regions (cf. Bartscher et al. 2020).[18] The event window runs from $\underline{j}$ to $\overline{j}$, where j denotes periods relative to the event e in state s. Schmidheiny and Siegloch (2019) discuss the importance of binning the treatment indicators at the end points $\underline{j}$ and $\overline{j}$, and show that this allows to identify the dynamic treatment effects even when no never-treated units are present.[19] This is important in the current setup, because all states are eventually treated by the federal act, meaning that there are no more non-treated states after 1975. Correspondingly, the treatment indicators D_{st}^j are defined as

[17] Some robustness checks are not reported for the sake of space. All results are available upon request.
[18] State-level house price indices are only available since 1975.
[19] This is equivalent to an effect window from $-\infty$ to ∞, where $\beta^j = \beta^{\underline{j}} \; \forall \; j < \underline{j}$ and $\beta^j = \beta^{\overline{j}} \; \forall \; j > \overline{j}$ (see Schmidheiny and Siegloch 2019)

$$D_{st}^{j} = \begin{cases} \mathbb{I}_{t \leq e_s + j} & if\ j = \underline{j} \\ \mathbb{I}_{t = e_s + j} & if\ \underline{j} < j < \overline{j} \\ \mathbb{I}_{t \geq e_s + j} & if\ j = \overline{j} \end{cases}.$$

The treatment period e_s is chosen as the year when the law in state s became effective. For all states which had not introduced any state-level legislation against credit discrimination in home financing before the effective date of the ECOA in 1975, I choose 1975 as the treatment year. This includes seven states whose laws did not pertain to home financing (see Table B.3).

Given the results from the difference-in-difference results at the national level, I will focus on the extensive margin and consider the outcomes homeownership and house size.[20] I consider households in which the wife had a positive average labor income over the three periods prior to the event, and compare their outcomes between treated and untreated states before and after the event. Note that in the national-level difference-in-difference regressions, the effects are identified from a comparison between households with different female income contributions (or households with and without a working wife in the binary case) before and after the reform. However, one may be worried that households with a working wife are not fully comparable to households with a non-working wife for potentially unobservable reasons. While I include demographic controls and household fixed effects in all my regressions, a further advantage of the event study design is its immunity to this concern, because the identification here comes from a comparison of households with a working wife in states which have already introduced anti-discrimination legislation in a given year to other households with a working wife in states which have not introduced such legislation yet.

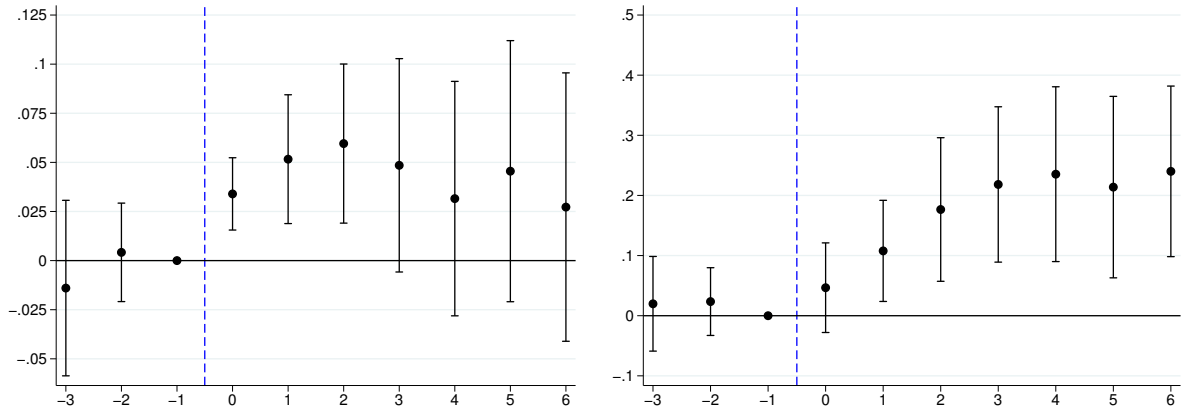
The results are shown in Figure 8.[21] Households with a working wife in the pre-reform period increased their homeownership and house size significantly more in treated states than in control states after the reform. By contrast, there were no differences across states in the pre-reform years. The homeownership effect stabilizes at around 5 percentage points, which is a similar order of magnitude as the 6.5 percentage points estimated in the binary difference-in-difference specification in Table 3. The dynamic pattern also resembles the one found in the difference-in-difference regressions, with a gradual build-up of the effect and a subsequent stabilization, consistent with the fact that housing is a slow-moving variable. Figure B.13 in the Appendix shows that there is also a positive effect on housing-to-income ratios, although the coefficients are estimated less precisely.[22] The fact that the effects obtained from the alternative event study identification align well with

[20] Due to the timing of the reforms, I cannot use DTI or DSTI as the outcome, as I do not observe these variables between 1973 and 1975.

[21] Note that the coefficient β_{-1} was standardized to zero, following the common practice in the event study literature (Schmidheiny and Siegloch 2019).

[22] The results are similar when estimating the model in first differences instead of with fixed effects.

Figure 8: Event study



(a) Homeownership

(b) House size

Notes: The graph shows the coefficients on the treatment indicators D_{st}^{j} from equation (3). The sample was restricted to households in which the wife had a positive average labor income over the three years prior to the event. Standard errors are clustered at the state and household level. The whiskers indicate 95% intervals.

those found in the difference-in-difference setup lends support to a causal interpretation of the national-level results.

4.5.2 Contemporaneous events

The event study results provide evidence in support of the hypothesis that the national-level results do not simply reflect the effects of other events in the reform period. In order to lend further credibility to my results, I examine plausible candidates for potential confounding events in more detail, and assess the robustness of the national-level difference-in-difference results to corresponding control strategies.

One potential concern is that the entrance of the baby boomer cohort born 1946-1964 into housing markets in the 1970s might be driving my results. However, I implicitly control for cohort membership via the age and time fixed effects. Moreover, I verified that the same patterns emerge when restricting the sample to households with a wife or head below 30 or 35 years of age in 1971. Furthermore, I investigated the robustness of the results to exploiting the cohort dimension in a triple-difference design. As noted in Section 2, the likelihood of a working wife's income being discounted was lower if she was no longer of childbearing age. It can thus be expected that women who were already older at the time of the reform were less affected. Based on this reasoning, I added the difference between younger and older cohorts to my regression (see Section B.3). Appendix Figure B.2 shows that the triple-difference identification supports the results from the difference-in-difference estimations. The point estimates are even slightly larger than in the baseline, consistent with the hypothesis that the effects are stronger for younger households.

Leombroni et al. (2020) argue that the Great Inflation of 1965 to 1982 induced portfolio shifts from equity to housing in the 1970s.[23] I therefore want to make sure that my results are not driven by differential stock market exposure of married households with different female income contributions. Due to lacking information on financial assets in the data, I cannot directly control for stock ownership. However, the SCF+ data show that the income-richest 10% of households held 70% to 80% of all stock wealth in the 1970s. At the same time, the effect of inflation on the user cost of housing via taxes is more pronounced for high-income households (Poterba 1991). I hence assessed the robustness to excluding top 10% households. Reassuringly, the patterns are very similar to the baseline.

In 1972, another equal opportunity law was passed: the Equal Employment Opportunity Act (EEOA). The EEOA authorized the Equal Employment Opportunity Commission of 1965 to initiate lawsuits on behalf of workers, and expanded the coverage of Title VII of the 1964 Civil Rights Act, which outlawed discrimination in wages and employment opportunities, to employers with more than 15 instead of 25 employees (Hill 1977). Yet the original version of Title VII became effective a whole decade prior to the ECOA, and the Equal Pay Act had already mandated equal pay for equal work of men and women in 1963 (Altonji and Blank 1999). Apart from that, I use the average female income share before 1972 as the interaction variable, which is independent of the EEOA. Theoretically, women with a higher pre-1972 income share could have been more likely to sue for higher wages after 1972, boosting their total household income. However, I control for household income and consider outcomes normalized by income to make sure that the effect is not driven by simple differential changes in available household income.

The year 1973 was also marked by a severe oil crisis. However, cars were of course not only used by working wives at the time, but also by homemakers, who had become an important clientele for car makers and were actively targeted in advertisements (Hill 2002). As a validation, I controlled for the household's total number of cars as a proxy for their exposure to oil prices, or the households' average commuting costs in 1970 and 1971. The results remain virtually unaltered.

The 1960s and 1970s saw important changes in birth-control and divorce laws. "The pill" spread rapidly among married households after its introduction in 1960, facing a peak in 1967 (Goldin and Katz 2002). The diffusion among singles was delayed because their access to oral contraceptives was initially impaired by state laws on the age of majority (see also Bailey 2006). The abolition of these laws in the 1960s and early 1970s predominantly affected single women. However, one might imagine that the households of married women were enabled to borrow more because the wife had had early access to the pill before marriage, and could therefore obtain a higher level of education (Goldin and Katz 2002) or gain more work experience (Bailey 2006), making her more creditworthy.

[23] The mechanism is that higher expected inflation lowers the expected after-tax real return of equity, but tends to reduce the user cost of housing, because housing capital gains are quasi untaxed in the U.S., whereas mortgage interest is tax-deductible (Poterba 1984).

I therefore used the data on state consent laws determining early access to the pill from Bailey (2006), and re-estimated the state-level event studies after including a dummy for whether a state allowed early access to the pill. Alternatively, I specified the dummy to be one if a state had allowed early access for at least four years to account for the typical duration of a bachelor's degree. In both cases, the results remain virtually unchanged.

With more liberal divorce laws, financially independent women might have a higher likelihood of divorce. However, Appendix Figure B.7 shows that divorce rates already started to increase around 1965. Chang (2018) shows that a liberalization of divorce laws puts downward pressure on married households' homeownership, since houses are indivisible and thus cannot be split easily upon divorce. If within the group of married households with working wives those without a house were more likely to get divorced and leave the sample, while the same was not true for married households with a non-working wife, this might lead to a larger increase in homeownership among the former. Yet while I find a negative association between homeownership and the likelihood of divorce in the data, I find no evidence that this relationship would depend on the wife's earnings. Moreover, I restricted the sample to households who had entered the PSID at the latest in 1971, were still in the survey in 1985, and never reported a transition from married to single in between. Although this reduces the number of observations by about a third, Appendix Figure B.8 shows that the baseline pattern survives.

The Vietnam War officially ended in 1975. Returning veterans could obtain cheaper loans due to insurance by the Department of Veterans Affairs (VA) (Foote and Peterson 2008). One could imagine that many of them were single, and that if they were married, the wife contributed more to the household income while her husband was at war. However, most U.S. troops had already been withdrawn from Vietnam by 1972 (see Figure B.9). As a robustness check, I re-estimated the regressions for married households on a sample from which I excluded all households whose head had been in the armed forces any time between 1969 and 1975. Of course, this also excludes households whose head was in the armed forces without being a veteran. Nevertheless, Appendix Figure B.10 shows that the results are still similar for this restricted sample.

Finally, Bastian (2020) argues that the introduction of the Earned Income Tax Credit (EITC) in 1975 induced around one million American mothers to join the labor force. The EITC is an earnings subsidy to working parents. In its original design, parents with annual nominal earnings of up to 4,000 dollars could obtain a maximum subsidy of 400 dollars. Reduced subsidies were available to households with earnings up to 8,000 dollars. It is important to note that households were eligible for the EITC independent of the wife's work status, as long as the household's total labor income did not exceed the thresholds, and at least one child lived in their home. In order to test if my results nevertheless simply capture effects of the EITC, I excluded all eligible households from my sample and only retained households with total nominal earnings above 8,000 dollars,

or without children living at home, for the years after 1975. Appendix Figure B.11 shows that the baseline results remain intact.

4.5.3 Alternative variable specifications

In a final set of sanity checks, I also tested the robustness of my results to the use of alternative outcome and interaction variables. As both income and housing or housing debt might change in response to the reform, I chose to use the wife's pre-reform income share as my interaction variable in the baseline. I verified that similar qualitative patterns emerge when using the wife's share in contemporaneous income (see Appendix Figure B.5). In Appendix Figure B.6, I further use non-normalized housing debt and housing assets as the outcome variable, controlling for income. The figure shows an increase in both variables after the reform, although the effect on housing is estimated with less precision.

In the baseline analysis, I consider the share of the wife's *labor* income in *total household income* as the interaction variable, since comprehensive information on other income of the wife is only consistently available since 2005 in the PSID. However, labor income accounts for the largest share of most households' income, with a median of 83% between 1969 and 1985. As a robustness check, I used the wife's share in the total *labor* income of head and spouse. The results are reported in Table B.2 and Figure B.4 in the Appendix, and resemble the baseline. The effect is somewhat smaller, with an increase in debt-to income of 0.11 percentage points for a one percentage point higher average pre-reform share in the couple's total labor income. There are some households in which the wife earns a substantial share of the couple's total labor income, but still a small share of total household income. For instance, the wife may earn a small salary on a part-time job, whereas the head does not work for money at all, but receives substantive capital income. In such a case, the wife may contribute 100 percent to the household's *labor* income, but her contribution to overall income is still minor and thus will not substantially affect the household's borrowing capacity. A somewhat smaller effect can thus be expected.

5 Labor supply incentives

Upon its introduction, the ECOA primarily affected households in which the wife had already been working. However, the ECOA might also have incentivized women to increase their labor supply in the subsequent years in order to benefit from the new lending rules. Given search frictions and the fact that the ECOA still allowed banks to take women's employment continuity into account (to the same extent they were taking that of men into account), such effects would materialize in the medium to long rather than the short run. Would a woman at the beginning of her life cycle make different plans for her financial and professional future in the post-reform world compared to the pre-reform

world? To answer this question, I use a structural model of households' homeownership and borrowing over the life cycle.

The theoretical effects on labor supply are ex ante ambiguous. In order to buy a house of a given size, a woman can afford to work less if 100% instead of 50% of her income can be counted for the mortgage. On the other hand, an additional dollar of income now translates into a higher borrowing capacity one-for-one, making labor supply more attractive. Consider the stylized example of a woman with an earnings potential of 30 dollars. Her husband currently earns 30 dollars, and their housing preferences are such that a suitable home would at least cost 120 dollars. With a maximum DTI ratio of 2, they would need at least 60 dollars of income. As long as the couple can only borrow against half of the wife's income, i.e. 15 dollars, they will still not be able to buy their desired home even if the wife is working. Yet once the full income of the wife can be used, there is a strong incentive for her to take up work.

Based on a life-cycle model calibrated to data from the British Household Panel Survey (BHPS) for the period 1991 to 2002, Bottazzi, Low, and Wakefield (2007) show that the empirical correlation between large housing debt and longer female hours worked can be generated by the requirement to meet current mortgage obligations. They further show that a tightening of the DTI constraint, which operates on both male and female income in their model, leads to delayed home purchases. They do not report effects on FLFP, but note that the effects they found were small. Pizzinelli (2018) calibrates a similar two-earner model to BHPS data from 1991 to 2008, and allows the income of the secondary earner to influence the DTI constraint in a different way than that of the primary earner. In his specification, the DTI always depends on full-time earnings, i.e., the earnings the secondary earner would have when working full time. He simulates a relaxation of this DTI constraint by increasing the multiplier on the secondary earner's full-time labor income, and finds a positive effect on the secondary earner's labor supply. His results further imply that the secondary earner's LFP response can amplify the increase in homeownership.

In the following, I will build a life-cycle model similar to the frameworks in these papers. After describing the model and my strategy to calibrate it to the early 1970s in the following subsections, I will use it as a laboratory to examine whether and to what extent the act had the power to change women's labor supply incentives.

5.1 Model

My goal is to examine whether women changed their financial and career planning at the beginning of the life cycle in response to the reform. To do so, I build a simple life-cycle model with borrowing constraints as described in Section 4.1. Households are formed at

age $j = 25$. Both spouses retire at age 65, and die at age 80.[24] They maximize their utility over consumption c_j, female labor supply n_j^f and housing h_j:

$$u(c_j, n_j^f, h_j) = \frac{c_j^{1-\sigma}}{1-\sigma} + \theta^f(j)\frac{(1-n_j^f)^{1-\psi}}{1-\psi}\mathbb{I}_{j\leq 65} + \left[\chi(j)\mu^h + \phi^h\frac{h_j - \underline{h}}{\overline{h} - \underline{h}}\right]\mathbb{I}_{h>0}.$$

The parameter σ determines the degree of risk aversion. $\theta^f(j)$ determines the strength of preferences for a working-age wife's time spent on other activities than market work, which can vary over the life cycle to reflect changes in the disutility of working induced by, e.g., the presence of small children in the household or the need to take care of grandchildren. ψ governs the elasticity of female labor supply. The strength of basic housing preferences depends on the parameter μ^h, and ϕ^h determines the preference for a larger house. Households can buy houses of a smaller size $\underline{h} = 1$ or a larger size $\overline{h} = 2$. Following a suggestion of Druedahl (2015), preferences for owning versus renting are allowed to vary over the life cycle, reflecting factors such as changing mobility preferences and changes in demand for space. I model these time-varying preferences in a reduced-form way, similar to Pizzinelli (2018), by pre-multiplying μ^h with an age-dependent factor $\chi(j)$ (see Section 5.2 and Appendix D.2 for details).

Log hourly wages w_j^s are modeled as the sum of a deterministic function of age and an autoregressive process:

$$\begin{aligned} ln(w_j^s) &= \alpha_0^s + \alpha_1^s j + \alpha_2^s j^2 + \alpha_3^s j^3 + \alpha_4^s j^4 + ln(z_j^s), \quad s = m, f \\ ln(z_j^s) &= \rho^s ln(z_{j-1}^s) + \varepsilon_j^s, \quad \varepsilon_j^s \sim N(-\frac{\sigma_{\varepsilon^s}^2}{2}, \sigma_{\varepsilon^s}^2). \end{aligned} \tag{4}$$

Both spouses' wages are subject to idiosyncratic risk. Men always have a standard full-time contract, corresponding to 40 hours per week. Women can choose whether to work or not, and whether to work full-time or part-time. Specifically, they can choose to work 20, 30, 40 or 50 hours a week. In other words, they choose between discrete contracts in the set $\mathcal{N} = \{0, 20/T, 30/T, 40/T, 50/T\}$, which express n_j^f as hours worked relative to the total number of non-sleeping hours per week $T = 7 \times 16 = 112$.[25] Working less than 40 hours a week is associated with a part-time penalty $\mathcal{P}$. After age 65, both spouses receive a retirement income based on the replacement rate b. The retirement income is calculated as b times the realization of the wage process in the last pre-retirement period.[26]

Households can save in a risk-free financial asset a_j at the interest rate $r = r^s$. They can also borrow $d_j = -a_j$ at a rate of $r = r^b$. This implies that households cannot hold both positive financial assets and mortgage debt at the same time, as in Attanasio et al.

[24] The household's age is defined to be the age of the head. In my baseline sample, the (male) head is on average three years older than the (female) spouse in the 1970s.

[25] I experimented with different specifications of $\mathcal{N}$. Contracts with more than 50 hours are never chosen under plausible calibrations. This is in line with the data, where less than 1 percent of women report such high working hours in the early 1970s.

[26] Women's retirement income is computed based on a full-time contract.

(2012) and Pizzinelli (2018).[27] Borrowing is limited by the LTV and DTI constraints from equation (1). Mortgages are modeled as long-term debt, meaning that households must only fulfill the LTV and DTI constraint upon origination of the mortgage (Attanasio et al. 2012, Kaplan, Mitman, and Violante 2019). An alternative modeling option would be to impose a DSTI instead of a DTI constraint. However, the DSTI and DTI ratio are directly proportionate for a mortgage with fixed duration and interest rate, as shown in Appendix D.1.[28] The advantage of formulating the constraint in terms of debt rather than mortgage payments relative to income is that it can be compared directly to the LTV constraint, as illustrated in Appendix Figure D.1.

I follow Attanasio et al. (2012) and require that households at least pay the interest $r^d d_j$ on their outstanding debt. As shown in Appendix D.1, this is equivalent to the constraint $d_{j+1} \leq d_j$. Since the model is meant to describe the early 1970s, when home equity withdrawal was still uncommon (Bartscher et al. 2020), households are not allowed to extract home equity.[29] Households close to or in retirement (above 60 years of age) cannot take out new debt, but can continue to repay their pre-existing debt. This implies $\phi(\cdot) = 0 \; \forall \; j \geq 65$.

Since it is not the interest of this paper to model debt and homeownership in old age, I abstract from bequests. In the last period of life, households are required to pay all outstanding debt and consume what is left of their wealth. Households choose c_j, a_{j+1}, n_j^f, and h_j, given the current vector of states $X_j = [a_j, h_{j-1}]$. The model is in partial equilibrium. A household can either own a house ($h_j \in \{\underline{h}, \overline{h}\} > 0$) at prices $\underline{p}$ and $\overline{p}$, or rent one ($h_j = 0$) at cost q. Selling or buying a house is subject to transaction costs F^s and F^b, reflecting costs for real estate agents, legal fees and transaction taxes (cf. Attanasio et al. 2012).

In summary, households have to solve a utility maximization constraint subject to a budget constraint and borrowing constraints which depend on whether the household is a renter, owns a "regular-size" house ($h_j = 1$) or owns a large house ($h_j = 2$). The wife's labor income depends on her labor supply choice $n_j^f \in \mathcal{N}$, where her wage is discounted by part-time penalties $\mathcal{P}$ if she chooses to work less then full-time. Mathematically, the problem can be summarized as follows:

$$V_j(X_j) = \max_{c_j, n_j^f, a_{j+1}, h_j} u(c_j, n_j^f, h_j) + \beta V_{j+1}(X_{j+1}) \quad s.t. \tag{5}$$

$$c_j + a_{j+1} + p h_j (1 + F^b \, \mathbb{I}_{h_j \neq h_{j-1}}) + q \, \mathbb{I}_{h_j = 0} = (1 + r) a_j + y_j^m + y_j^f + p h_{j-1} (1 - F^s \, \mathbb{I}_{h_j \neq h_{j-1}})$$

[27] As discussed by Druedahl (2015), this simplification comes at the cost of ruling out precautionary balance sheet expansions. He shows that the difference between the net and gross debt formulation of the model of Attanasio et al. (2012) is less important if there is an interest rate spread.

[28] Adjustable-rate mortgages were allowed only in 1982 (Garn–St. Germain Depository Institutions Act).

[29] Hardly and households had second mortgages in the early 1970s (Bartscher et al. (2020)). HELOCs only spread in the mid-1980s (Maki 2001). Cash-out refinancing was not yet common either. In the 1977 SCF, only 3% of the respondents stated they had ever refinanced their first mortgage at all.

$$y_j^f = w_j^f n_j^f \mathcal{P} T$$

$$a_{j+1} \geq \begin{cases} 0 & if\ h_j = 0 \\ min\{a_j, 0\} & if\ h_j > 0\ \wedge\ h_j = h_{j-1} \\ -\phi(h_j, y_j^m, y_j^f) & if\ h_j > 0\ \wedge\ h_j \neq h_{j-1} \end{cases}$$

$$h_j \in \{0, 1, 2\}$$

$$n_j^f \in \mathcal{N}.$$

5.2 Calibration

I calibrate the model to the early 1970s, and investigate the effects of relaxing the DTI constraint based on the creditable share of the wife's income. The LTV and DTI limits are set to $\lambda^h = 1$ and $\lambda^y = 2$, which corresponds to the 90th percentile of the LTV and DTI distributions for new homeowners in the baseline sample between 1969 and 1971. House values and net rental costs are chosen based on the same data. The rental cost is set to the median rental cost of around 5,300 dollars in the data. The value of the "entry level" house is set to the average house value among households between ages 25 and 35, which is approximately 110,000 dollars. The value of the larger house is set to match the average for households aged 40 to 50 in the data (around 135,000 dollars), which is the period when life-cycle house values peak in the data. To calibrate the mortgage interest rate, I use the 1971 wave of the SCF+. Specifically, I compute the median mortgage rate of married homeowners aged 25 to 64 who bought a home within the same or previous year and have an interest-bearing mortgage, which is 6.3%. The savings interest rate is set to the annual three-month treasury bill rate published by the Board of Governors of

Table 4: Externally calibrated parameters

name	value	definition	target/source
λ^h	1	LTV limit	PSID
λ^y	2	DTI limit	PSID
λ^d	0.5	income discounting factor	ECOA
q	0.53	net rental cost	PSID
$p_1 h_j$	11	house value $h_j = 1$	PSID
$p_2 h_j$	13.5	house value $h_j = 2$	PSID
r^s	0.043	interest rate on savings	Federal Reserve
r^b	0.063	interest rate on debt	SCF+
σ	2	CRRA parameter	
β	0.94	discount factor	
b	0.7	pension replacement rate	Attanasio et al. (2012)

Notes: The table summarizes the externally calibrated parameters. See text for details.

Table 5: Internally calibrated parameters

name	value	definition
ψ	1.64	labor elasticity parameter
μ^h	2.51e-3	basic housing preference parameter
ϕ^h	5.01e-3	house size preference parameter
F_b	0.04	buying cost
F_s	0.07	selling cost
$\theta^f(j)$	see Appendix D.2	female leisure preference profile
$\chi(j)$	see Appendix D.2	housing utility profile

Notes: The table summarizes the internally calibrated parameters. See text for details.

the Federal Reserve System (FRED series TB3MS), which was 4.3% in 1971. The CRRA parameter σ is set to the common value of 2, and the discount factor β is chosen as 0.94. The pension replacement rate is set to 0.7, as in Attanasio et al. (2012). An overview of the externally calibrated parameters is given in Table 4.

The remaining parameters are chosen to minimize the average squared distance between moments from the data and the model. I target average homeownership, mortgagor and FLFP rates in ten-year age bins. A summary of the model and data moments is given in Appendix Table D.2. Table 5 summarizes the internally calibrated parameters. The estimated value for the parameter ψ is 1.64. Based on a 30-hour contract and a time endowment of $T = 112$ non-sleeping hours, this implies a labor supply elasticity of $(1 - 30/112)/(1.64 \cdot 30/112) \approx 1.67$, which is within the range of estimates for the aggregate elasticity (intensive and extensive margin) over the life cycle (between 1.37 and 1.93) found by Attanasio et al. (2018). With values of 4% and 7%, the transaction cost parameters F_b and F_s are similar to the median selling and buying costs of 2.5% and 7% reported by Martin and Gruber (2004) based on the U.S. Consumer Expenditure Survey. I use polynomials to model the age-dependent preference parameters $\theta^f(j)$ and $\chi(j)$. The resulting profiles are plotted in Figure D.2. Their shape aligns well with the timing of life-cycle events such as the arrival of children and grandchildren, as discussed in more detail in Appendix D.2.

I estimate the wage processes from equation (4) based on my baseline PSID sample of married households. Following Borella, De Nardi, and Yang (2018), I include households between 20 and 70 years of age when estimating the deterministic part to avoid end point problems, but compute the variances based on households working-age households between 25 and 64. The wage processes are estimated separately for husbands and wives.[30] Men and women working below 500 hours per year are considered as not working in the given year, such that their wages are set to zero. I regress log real hourly wages on a

[30] In the model simulations, ε_j^s, $s = m, f$ are allowed to be correlated, following a standard approach in the literature. I employ a correlation coefficient of 0.25 based on the estimate of Hyslop (2001).

Table 6: Parameters of wage profiles

names	values
α_0^m, α_1^m, α_2^m, α_3^m, α_4^m	-1.5381, 0.4036, -0.0132, 0.0002, -1.1439e-6
α_0^f, α_1^f, α_2^f, α_3^f, α_3^f	-0.7490, 0.2889, -0.0085, 0.0001, -4.8191e-7
$\sigma^2_{\varepsilon^m}$, $\sigma^2_{\varepsilon^f}$	0.0062, 0.0056
$\mathcal{P}^{50}$, $\mathcal{P}^{75}$	0.8301, 0.9368

Notes: The table shows the estimated coefficients of the log wage processes from equation (4) and the estimated part-time penalties $\mathcal{P}^{50}$ and $\mathcal{P}^{75}$. See text for details.

quadratic polynomial in household age, dummies for the number of children, as well as state and 5-year cohort fixed effects. For the wives, I apply a Heckman model, in which selection is based on "other" household income (total household income net of the wife's labor income), the number of children and the total household size. The intercepts α_0^s are determined by averages for the cohort born between 1945 and 1950, who were of typical "home-buying age" in the early 1970s. As women can work part-time in the model, I allow for part-time penalties $\mathcal{P}^{50}$ and $\mathcal{P}^{75}$ by including dummies for working 50% or 75%.

Following the previous literature, the parameter ρ^s is set to one for both spouses. The variances $\sigma^2_{\varepsilon^s}$, $s = m, f$ are estimated according to the method of Heathcote, Perri, and Violante (2010).[31] Table 6 shows the estimated coefficients, and Appendix Figure D.1 plots the resulting income profiles under certainty. Additional details on the model solution are given in Appendix D.2.

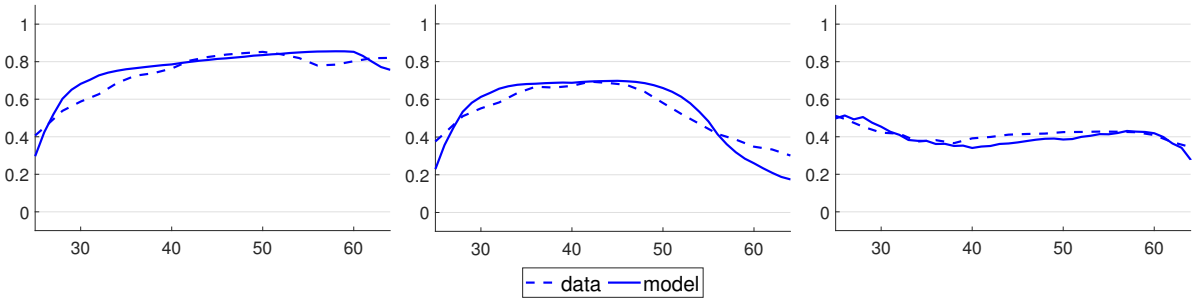
5.3 Experiment: relaxation of DTI constraint via female income

Figure 9 shows the homeownership rate, the share of households with mortgage debt, and the female labor force participation rate over the life cycle, computed from 10,000 simulations of the model. The model produces similar average homeownership, mortgagor and FLFP rates within ten-year age bins, which is a success of the calibration strategy (cf. Appendix Table D.2). Besides, the model is also able to reproduce the overall shape of the empirical life-cycle profiles from the PSID, which are shown as dashed lines in Figure 9. It should also be noted that despite the simplification of a choice between discrete contracts, the model produces an intensive margin of labor close to the data, with an average of slightly above 28 compared to 31 hours.

In the following, I will use the model as a laboratory to simulate the effects relaxing the borrowing constraint via the female income discounting factor λ^d. Table 7 summarizes the

[31] This estimation is based on identifying autocovariance moments in levels, as the alternative identification based on moments in differences tends to overestimate the variance of the permanent shock, leading to an unrealistic growth of wage inequality over the life cycle (see also Daly, Hryshko, and Manovskii 2018).

Figure 9: Comparison to data



(a) Homeownership (b) Mortgagor rate (c) FLFP

Notes: The graph compares the homeownership rate, the share of mortgagors and the FLFP rate over the life cycle from the model to the corresponding life-cycle profiles from the PSID for the period 1969-1971. The FLFP rate in the data refers to women working at least 500 hours per year. The data profiles were smoothed by taking a three-year moving average.

results of my experiment. It shows how the shares of homeowners, mortgage holders and working wives change when the female income discounting factor λ^d is raised from 50% to 100%, such that households can count all of the wife's income toward a mortgage. In the cross section, the homeownership rate of married households between ages 25 and 64 increases by 9.5 percentage points. The surge in the share of households holding mortgage debt is similar, with 9 percentage points. These increases are not merely due to the fact that households can borrow against a higher share of what the wife would have earned anyway. The third row of Table 7 shows that the reform produces incentives for women to join the labor force, such that the FLFP rate increases by around 2 percentage points. At the intensive margin, female labor supply changes little, with women working about half an hour less per week on average. This is because on the one hand, the women who would also have worked in the pre-reform scenario with $\lambda^d = 0.5$ choose to work slightly less (around 20 minutes per week). On the other hand, the women who join the labor force under the new scenario, but would not have worked in the old one, work somewhat

Table 7: Comparison: $\lambda^d = 0.5$ versus $\lambda^d = 1$

variable	difference	difference with fixed FLFP
homeownership	0.095	0.051
mortgagor rate	0.090	0.048
FLFP	0.019	0
hours (intensive margin)	-0.561	0

Notes: The first column shows the average changes in homeownership, the share of mortgagors and female labor force participation (in percentage points) as well as the change in average intensive-margin female hours worked (in hours) among households aged 25 to 64 when increasing the income discounting factor λ^d. from 0.5 to 1. The second column shows the respective differences when holding female labor supply choices constant at the optimal values from the pre-reform scenario with $\lambda^d = 0.5$.

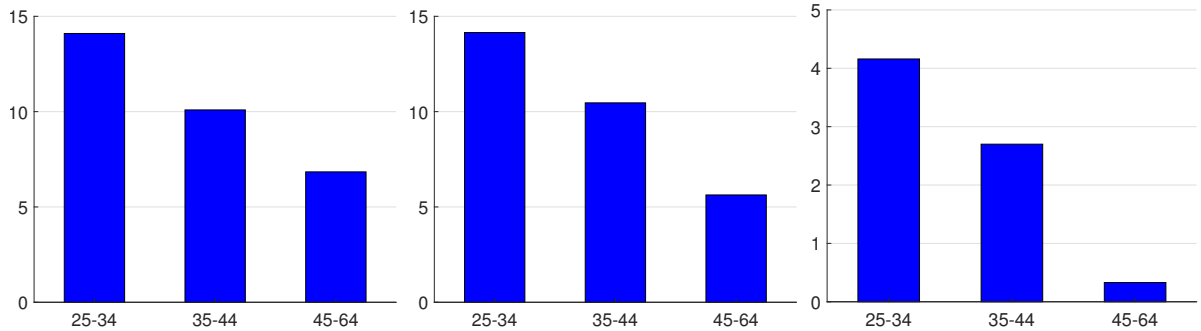
less than the average (23.5 compared to 28 hours per week).

In order to get an impression of the relative importance of the increase in FLFP for the change in homeownership, the last column of Table 7 presents a counterfactual exercise. I compute conditional policy functions for each possible female labor supply choice under the post-reform scenario with $\lambda^d = 1$. In the simulations, I then use the realized trajectory of n_j^f from the simulation under the pre-reform scenario with $\lambda^d = 0.5$, and compute the asset and housing choices based on the conditional policy function corresponding to this "old" labor supply choice in each period. In other words, I simulate a scenario in which women can now use their full income for the mortgage, but they cannot adapt their labor supply relative to the pre-reform scenario. Without additional women joining the labor force, the increase in homeownership and the share of mortgage holders would only be around 5 percentage points. This is a similar order of magnitude as the empirical estimate of 3.3 percentage points from Section 4.4. The model therefore suggests that the medium- to long-run effects of the ECOA on homeownership even exceeded the impact effects by encouraging more married women to join the labor force.

Figure 10 shows the effects of the reform over the life cycle. The effects are strongest for young households between 25 and 34 years of age, and decline as households become older. For households in the young group, who are of typical "home-buying age", the wives' LFP increases by around 4 percentage points. The ability to count twice as much of the wife's income toward the mortgage as before, combined with the active increase in FLFP, enables households to prepone homeownership, such that the homeownership rate in the youngest group increases most drastically.

Finally, Figure 11 further decomposes the results from Figure 10 by male income. As can be expected, the reforms bears the greatest advantages for households with low-income husbands. Interestingly, the effect is much more persistent over the life cycle for low-male-income households. While young households benefit from the reform even if the husband

Figure 10: Life-cycle effects of raising λ^d from 0.5 to 1

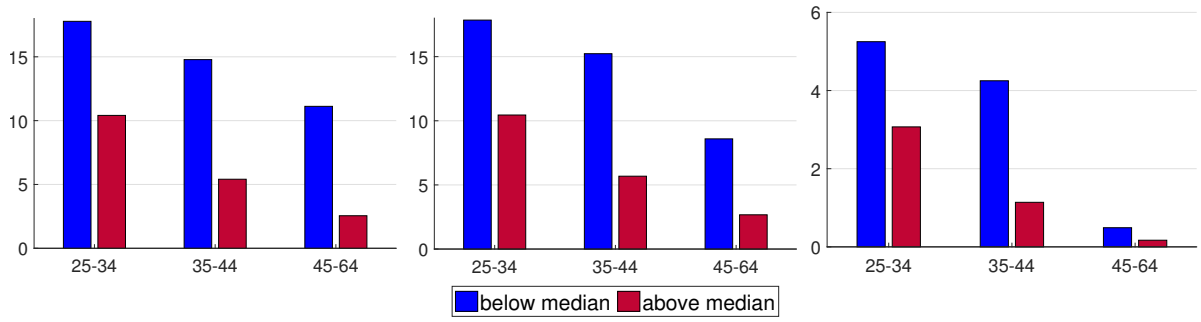


(a) Homeownership (b) Share of mortgagors (c) FLFP

Notes: The graph shows the change in the homeownership rate, the share of mortgagors and the FLFP rate (in percentage points) over the life cycle when increasing the female income discounting factor λ_d from 0.5 to 1.

has above-average earnings, the effects at older ages are almost exclusively driven by households with lower male earnings.

Figure 11: Heterogeneous effects: high versus low male income



(a) Homeownership (b) Share of mortgagors (c) FLFP

Notes: The graph shows the effects of the experiment in Figure 10, stratified by the husbands' incomes. Blue bars show the respective changes (in percentage points) for households with below-median male earnings, and red bars refer to households with above-median male earnings.

5.4 Discussion

The model shows that women who were planning their future in the early 1970s, based on the prevailing economic information, were more likely to embark on a working career. It further illustrates that additional female labor supply could substantially amplify the positive effects of equal credit opportunity laws on married couples' homeownership rates in the longer run, especially for younger couples and couples with lower male earnings.[32]

In an overlapping generations setup with intergenerational learning, the ECOA could generate further dynamic effects on labor supply by accelerating the pace at which women learn about the true cost of working (Fernández 2013). Furthermore, there might be spillovers to male employment and earnings in a setup with involuntary unemployment and search. In an important series of papers, Kyle Herkenhoff and coauthors have shown both empirically and theoretically that unemployed households take longer to find a job if they have more access to credit, but achieve higher earnings replacement rates, such that welfare improves (Herkenhoff 2019, Braxton, Herkenhoff, and Phillips 2020, Herkenhoff, Phillips, and Cohen-Cole 2020). As mentioned, home equity extraction became more popular from the 1980s on, and became even easier in the 1990s (Hurst and Stafford 2004). Hurst and Stafford (2004) have established that households experiencing an unemployment shock while having low liquid assets have a substantially higher propensity to refinance their mortgage and extract equity. Against this background, the ability to borrow against the home based on the wife's income if the husband becomes unemployed could allow him to search longer for a new job and obtain a better match.

[32] Of course, LFP and homeownership decisions in the data can also be influenced by factors such as price changes in house prices, interests rates, household composition or the availability of alternative sources of financing. Incorporating these factors into the model would go beyond the scope of this paper.

Additionally, home equity lines of credit (HELOCs) were introduced on a large scale in the mid-1980s (Maki 2001). Although they typically require the household to meet an debt-to-income constraint upon application, it will not require another income assessment every time the line is drawn on (see also Braxton, Herkenhoff, and Phillips 2020). Therefore, both husbands and wives who were able to buy a house with the help of the wife's income and establish a HELOC gained the ability to flexibly borrow against their home in the case of future unemployment, allowing them to better smooth their consumption and adapt their job search behavior. I view the analysis of the potential effects of the ECOA on job search and within-household income and consumption smoothing as an interesting avenue for further research.

6 Conclusion

This paper has shed light on the effects of the Equal Credit Opportunity Act on homeownership and mortgage borrowing of married households. The ECOA proscribed discriminatory practices in mortgage lending based on sex and marital status. In particular, it prohibited the formerly common practice to partially or even fully discount the wife's income in joint mortgage applications of married households. Although the ECOA required profound changes in creditors' lending practices, its effects on female access to credit have long remained an open question.

Using data from the PSID, I find that married households with a working wife increased their mortgage borrowing, and with it homeownership and house size, subsequent to the passage of the ECOA. The results are supported by event-study regressions exploiting state-level variation. Furthermore, the national-level results are robust to controlling for other contemporaneous events. The estimates imply that the new legislation enabled 1.4 million married households to move to an own home upon its introduction, and 1.8 million to take out a mortgage.

While the law initially mostly benefited households with a wife who had already been working, it also changed the labor supply incentives for women in future cohorts of new homeowners. I draw on a life-cycle model to explore potential changes in the incentives for married women's labor supply. The model shows that the incentives of the ECOA were powerful enough to increase the labor force participation rate of married women, thus amplifying the positive effects on married couples' homeownership rates in the longer perspective.

References

Agarwal, Sumit et al. (2020). *Searching for Approval*. Working Paper 27341. National Bureau of Economic Research.

Altonji, Joseph G. and Rebecca M. Blank (1999). "Race and Gender in the Labor Market". In: *Handbook of Labor Economics*. Vol. 3. Elsevier. Chap. 48, pp. 3143 –3259.

Andersen, Steffen, Julie Marx, Kasper Meisner Nielsen, and Lise Vesterlund (2020). *Gender Differences in Negotiation: Evidence from Real Estate Transactions*. Working Paper 27318. National Bureau of Economic Research.

Atalay, Kadir, Garry Barrett, and Rebecca Edwards (2016). *House Prices, Household Debt and Labour Supply in Australia*. Working Paper 266. AHURI Final Report.

Attanasio, Orazio, Peter Levell, Hamish Low, and Virginia Sánchez-Marcos (2018). "Aggregating Elasticities: Intensive and Extensive Margins of Women's Labor Supply". In: *Econometrica* 86.6, pp. 2049–2082.

Attanasio, Orazio, Hamish Low, and Virginia Sánchez-Marcos (2005). "Female Labor Supply as Insurance against Idiosyncratic Risk". In: *Journal of the European Economic Association* 3.2-3, pp. 755–764.

Attanasio, Orazio P., Renata Bottazzi, Hamish W. Low, Lars Nesheim, and Matthew Wakefield (2012). "Modelling the Demand for Housing Over the Life Cycle". In: *Review of Economic Dynamics* 15.1, pp. 1 –18.

Bailey, Martha J. (2006). "More Power to the Pill: The Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply". In: *The Quarterly Journal of Economics* 121.1, pp. 289–320.

Bartscher, Alina K., Moritz Kuhn, Moritz Schularick, and Ulrike I. Steins (2020). "Modigliani Meets Minsky: American Household Debt, 1949-2016". In: *Working Paper*.

Bastian, Jacob (2020). "The Rise of Working Mothers and the 1975 Earned Income Tax Credit". In: *American Economic Journal: Economic Policy*.

Beckey, Sylvia L. (1974). *Women and Credit: Available Legal Remedies Against Discriminatory Practices*. Tech. rep. Washington, D.C.: Congressional Research Service.

Borella, Margherita, Mariacristina De Nardi, and Fang Yang (2018). "The aggregate implications of gender and marriage". In: *The Journal of the Economics of Ageing* 11. Macroeconomics of Aging, pp. 6 –26.

Bottazzi, Renata, Hamish Low, and Matthew Wakefield (2007). *Why Do Home Owners Work Longer Hours?* Working Paper. Institute for Fiscal Studies.

Bowdish, Lawrence A. (2010). "Invidious Distinctions: Credit Discrimination against Women, 1960s–Present". PhD thesis. The Ohio State University.

Braxton, J. Carter, Kyle F. Herkenhoff, and Gordon M. Phillips (2020). *Can the Unemployed Borrow? Implications for Public Insurance*. Working Paper 27026. National Bureau of Economic Research.

Cairns, John W. (1976). "Credit Equality Comes to Women: An Analysis of the Equal Credit Opportunity Act". In: *San Diego Law Review* 13.4, p. 960.

Chang, Minsu (2018). "A House Without a Ring: The Role of Changing Marital Transitions for Housing Decisions". In: *Working Paper*.

Costa, Dora L. (2000). "From Mill Town to Board Room: The Rise of Women's Paid Labor". In: *Journal of Economic Perspectives* 14.4, pp. 101–122.

Cuomo, Andrew A. (1981). "Equal Credit Opportunity Act: How Much Can Women Expect". In: *Journal of Legislation* 8, p. 121.

Daly, Moira, Dmytro Hryshko, and Iourii Manovskii (2018). *Improving the Measurement of Earnings Dynamics*. Working Paper 22938. National Bureau of Economic Research.

Dao Bui, Kien and Ejindu S. Ume (2020). "Credit Constraints and Labor Supply: Evidence from Bank Branching Deregulation". In: *Economic Inquiry* 58.1, pp. 335–360.

Del Boca, Daniela and Annamaria Lusardi (2003). "Credit Market Constraints and Labor Market Decisions". In: *Labour Economics* 10.6, pp. 681 –703.

Diamond, Rebecca, Adam Guren, and Rose Tan (2020). *The Effect of Foreclosures on Homeowners, Tenants, and Landlords*. Working Paper.

Druedahl, Jeppe (2015). "The Demand for Housing Over the Life-cycle under Long-term Gross Debt Contracts". In: *Working Paper*.

Elliehausen, Gregory and Thomas Durkin (June 1989). "Theory and Evidence of the Impact of Equal Credit Opportunity: An Agnostic Review of the Literature". In: *Journal of Financial Services Research* 2, pp. 89–114.

Exler, Florian and Michèle Tertilt (2020). "Consumer Debt and Default: A Macro Perspective". In: *CESifo Working Paper*.

Fernández, Raquel (2013). "Cultural Change as Learning: The Evolution of Female Labor Force Participation over a Century". In: *American Economic Review* 103.1, pp. 472–500.

Field, Erica M., Rohini Pande, Natalia Rigol, Simone G. Schaner, and Charity Troyer Moore (2019). *On Her Own Account: How Strengthening Women's Financial Control Affects Labor Supply and Gender Norms*. Working Paper 26294. National Bureau of Economic Research.

Foote, B. Ellington and Meredith Peterson (2008). "VA-Home Loan Guaranty Program: An Overview". In: *Congressional Research Service, Library of Congress*.

Fortin, Nicole M. (1995). "Allocation Inflexibilities, Female Labor Supply, and Housing Assets Accumulation: Are Women Working to Pay the Mortgage?" In: *Journal of Labor Economics* 13.3, pp. 524–557.

Gates, Margaret J. (1974). "Credit Discrimination Against Women: Causes and Solutions". In: *Vanderbilt Law Review* 27, p. 409.

Geary, Anne J. (1976). "Equal Credit Opportunity — An Analysis of Regulation B". In: *The Business Lawyer* 31, pp. 1641–1658.

Gigot, Paul A. (1981). "Fading Dream". In: *The Wall Street Journal*.

Gladstone, Leslie W. (2004). "Equal Rights Amendments: State Provisions". In: *CRS Report for Congress*. Congressional Research Service, Library of Congress.

Goldin, Claudia and Lawrence F. Katz (2002). "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions". In: *Journal of Political Economy* 110.4, pp. 730–770.

Golding, Edward, Edward Szymanoski, and Pamela Lee (2014). *Fha at 80: Preparing for the Future*. Tech. rep.

Goldsmith-Pinkham, Paul and Kelly Shue (2020). *The Gender Gap in Housing Returns*. Working Paper 26914. National Bureau of Economic Research.

Greenwald, Daniel (2018). "The Mortgage Credit Channel of Macroeconomic Transmission". In: *Working Paper*.

Greenwood, Jeremy, Ananth Seshadri, and Mehmet Yorukoglu (2005). "Engines of Liberation". In: *The Review of Economic Studies* 72.1, pp. 109–133.

Haurin, Donald R. and Duewa A. Kamara (1992). "The homeownership decision of female-headed households". In: *Journal of Housing Economics* 2.4, pp. 293–309.

Hazan, Moshe, David Weiss, and Hosny Zoabi (2019). "Women's Liberation as a Financial Innovation". In: *Journal of Finance*.

Heathcote, Jonathan, Fabrizio Perri, and Giovanni L. Violante (2010). "Unequal We Stand: An Empirical Analysis of Economic Inequality in the United States, 1967–2006". In: *Review of Economic Dynamics* 13.1. Special issue: Cross-Sectional Facts for Macroeconomists, pp. 15 –51.

Herkenhoff, Kyle, Gordon Phillips, and Ethan Cohen-Cole (2020). "How Credit Constraints Impact Job Finding Rates, Sorting & Aggregate Output". In: *Working Paper*.

Herkenhoff, Kyle F (Feb. 2019). "The Impact of Consumer Credit Access on Unemployment". In: *The Review of Economic Studies* 86.6, pp. 2605–2642.

Hill, Daniel D. (2002). *Advertising to the American Woman, 1900-1999*. Ohio State University Press.

Hill, Herbert (1977). "The Equal Employment Opportunity Acts of 1964 and 1972: A Critical Analysis of the Legislative History and Administration of the Law". In: *Industrial Relations Law Journal* 2.1, pp. 1–96.

Hurst, Erik and Frank Stafford (2004). "Home Is Where the Equity Is: Mortgage Refinancing and Household Consumption". In: *Journal of Money, Credit and Banking* 36.6, pp. 985–1014.

Hyland, Marie, Simeon Djankov, and Pinelopi Koujianou Goldberg (2020). "Gendered Laws and Women in the Workforce". In: *American Economic Review: Insights*.

Hyman, Louis (2012). *Debtor Nation: The History of America in Red Ink*. Vol. 72. Princeton University Press.

Hyslop, Dean R. (2001). "Rising U.S. Earnings Inequality and Family Labor Supply: The Covariance Structure of Intrafamily Earnings". In: *American Economic Review* 91.4, pp. 755–777.

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor (2017). "Macrofinancial History and the New Business Cycle Facts". In: *NBER Macroeconomics Annual* 31.1, pp. 213–263.

Juhn, Chinhui and Simon Potter (2006). "Changes in Labor Force Participation in the United States". In: *Journal of Economic Perspectives* 20.3, pp. 27–46.

Kaplan, Greg, Kurt Mitman, and Giovanni L. Violante (2019). *The Housing Boom and Bust: Model Meets Evidence*. Working Paper.

Kaplan, Greg, Giovanni L. Violante, and Justin Weidner (2014). "The Wealthy Hand-to-Mouth". In: *Brookings Papers on Economic Activity* 45.1, pp. 77–153.

Kendig, Dennis (1973). "Discrimination Against Women in Home Mortgage Financing". In: *Yale Review of Law and Social Action* 3.2, p. 3.

Kleven, Henrik, Camille Landais, Johanna Posch, Andreas Steinhauer, and Josef Zweim ́uller (2019). "Child Penalties across Countries: Evidence and Explanations". In: *AEA Papers and Proceedings* 109, pp. 122–26.

Kohlhase, Janet E. (1986). "Labor Supply and Housing Demand for One- and Two-Earner Households". In: *The Review of Economics and Statistics* 68.1, pp. 48–57.

Kuhn, Moritz, Moritz Schularick, and Ulrike I. Steins (2020). "Income and Wealth Inequality in America". In: *Journal of Political Economy*.

Kumar, Anil and Che-Yuan Liang (2019). *Labor Market Effects of Credit Constraints: Evidence from a Natural Experiment*. Working Papers. Federal Reserve Bank of Dallas.

Ladd, Helen F. (1982). "Equal Credit Opportunity: Women and Mortgage Credit". In: *The American Economic Review* 72.2, pp. 166–170.

Lally, Maureen Ellen (1974). "Women and Credit". In: *Duquesne Law Review* 12.4, pp. 863–890.

"Legislative Column" (1975). In: *Clearinghouse Review* 9.2, p. 96.

Leombroni, Matteo, Monika Piazzesi, Martin Schneider, and Ciaran Rogers (2020). *Inflation and the Price of Real Assets*. Working Paper 26740. National Bureau of Economic Research.

Maki, Dean M (2001). "Household Debt and the Tax Reform Act of 1986". In: *American Economic Review* 91.1, pp. 305–319.

Martin, Robert F. and Joseph W. Gruber (2004). *Does Housing Wealth Make Us Less Equal? The Role of Durable Goods in the Distribution of Wealth*. Econometric Society 2004 North American Summer Meetings 15.

Michel, Jean-Baptiste et al. (2011). "Quantitative Analysis of Culture Using Millions of Digitized Books". In: *Science* 331.6014, pp. 176–182.

Morse, Adair and Karen Pence (2020). *Technological Innovation and Discrimination in Household Finance*. Working Paper 26739. National Bureau of Economic Research.

National Commission on Consumer Finance (1972). *Consumer Credit in the United States*. Report. U.S. Department of the Treasury.

Offer, Avner (2007). *The Challenge of Affluence*. Oxford University Press.

Pfeffer, Fabian T., Robert F. Schoeni, Arthur Kennickell, and Patricia Andreski (2016). "Measuring Wealth and Wealth Inequality: Comparing Two U.S. Surveys". In: *Journal of Economic and Social Measurement* 41.2, pp. 103–120.

Pizzinelli, Carlo (2018). "Housing, Borrowing Constraints, and Labor Supply Over the Life Cycle". In: *Working Paper*.

Poterba, James M. (1984). "Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach". In: *The Quarterly Journal of Economics* 99.4, pp. 729–752.

— (1991). "House Price Dynamics: The Role of Tax Policy and Demography". In: *Brookings Papers on Economic Activity* 2, pp. 143–203.

Schmidheiny, Kurt and Sebastian Siegloch (2019). "On Event Study Designs and Distributed-Lag Models: Equivalence, Generalization and Practical Implications". In: *Working Paper*.

Smith, James F. (1977). "The Equal Credit Opportunity Act of 1974: A Cost/Benefit Analysis". In: *The Journal of Finance* 32.2, pp. 609–622.

Statement of Economists (1972). *Federal Government's Role in the Achievement of Equal Opportunity in Housing: Hearings Before the Civil Rights Oversight Subcommittee (Subcommittee No. 4) of the Committee on the Judiciary, House of Representatives, 92d Congress*. U.S. Government Printing Office.

Tauchen, George (1986). "Finite state markov-chain approximations to univariate and vector autoregressions". In: *Economics Letters* 20.2, pp. 177 –181.

Thurston, Chloe N. (2018). *At the Boundaries of Homeownership: Credit, Discrimination, and the American State*. Cambridge University Press.

U.S. Advisory Commission on Intergovernmental Relations (1976). *State Actions in 1975*.

U.S. Department of Labor (1975). *1975 Handbook on Women Workers. Bulletin 297*. Government Printing Office Washington, D.C.

U.S. Office of Consumer Affairs (1975). *State Consumer Action: Summary '74*.

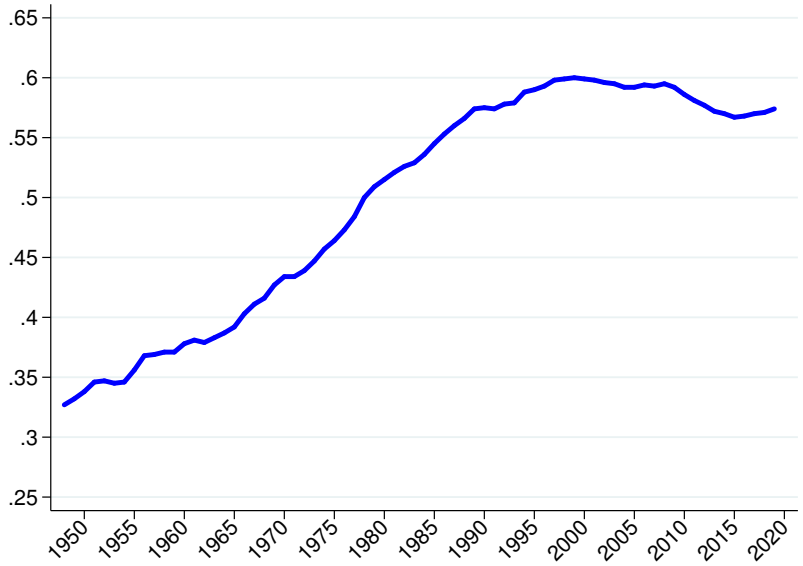
— (1976). *State Consumer Action: Summary '75*.

A Supplementary analyses

A.1 Female labor supply

Figure A.1 shows the aggregate female labor force participation rate from the U.S. Bureau of Labor Statistics over time.

Figure A.1: Female labor force participation



Notes: The graph shows the civilian labor force participation rate of women. Data source: U.S. Bureau of Labor Statistics.

In order to examine the labor supply decisions of married women around the time of a home purchase, I restrict my baseline PSID sample to households in which both spouses are below 60 years of age. As the effects on homeownership and housing debt in Section 4 mainly work via the extensive margin, I focus on renter-to-owner transitions. In a first step, I look at couples in which both spouses are working at the time of the home purchase. For couples that I observe over the 5 years subsequent to the home purchase (about 970 households between 1969 and 1985), I compute the number of those years during which the wife is still working.[33] Mortgage lenders who discounted the female's income were most concerned about debt-service capacity during the first years of a mortgage, which they considered as the most risky period (Thurston 2018). In my data, only 10% of the wives worked for less than 50% of the period covering the home purchase and the 5 following years. Another 7% worked for half of that period, and 61% stayed employed over the full period.

These numbers do not suggest that discounting female income across-the-board was justified. Nevertheless, female employment continuity was still below that of men. In the

[33] I use the years after 1985 to calculate forward-looking variables, and then truncate the sample to end in 1985, as in the baseline.

same households, 96.6% of the husbands worked every year during the period covering the home purchase and the subsequent 5 years. Yet while women are more likely to stop working, often to take care of children, it would not be a rational choice for a woman to voluntarily leave the labor force for childcare reasons if this means jeopardizing her mortgage and risking foreclosure (see also Lally 1974). In line with this reasoning, Fortin (1995) shows that Canadian women are more likely to work if their household would be closer to the debt-service constraint without their income.

Following the approach of Fortin (1995), I regress an indicator for female employment on indicators for whether the household's DSTI ratio without the female's labor income is between 10% and 17.5%, between 17.5% and 25%, or above 25%. Like Fortin (1995), I restrict the sample to homeowners. The regression includes age, state, household and region-year fixed effects. In model (2), I additionally control for the income group, the number of children, the value of the house, and the remaining mortgage balance. Table A.1 confirms that the patterns found by Fortin (1995) also apply to the PSID data.

Table A.1: Female labor force participation and debt service obligations

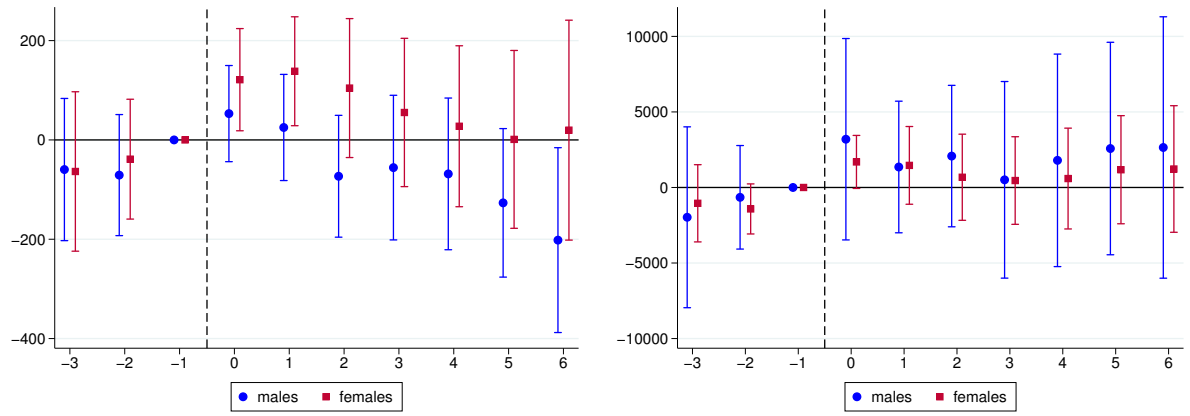
	(1)		(2)	
$DSTI^{wo}$ 10% - 17.5%	0.012	(0.013)	0.051***	(0.017)
$DSTI^{wo}$ 17.5% - 25%	0.026*	(0.015)	0.090***	(0.021)
$DSTI^{wo} > 25\%$	0.094***	(0.019)	0.182***	(0.027)
50% - 90%			0.132***	(0.014)
Top 10%			0.203***	(0.028)
1 Child			-0.031**	(0.014)
2 Children			-0.106***	(0.023)
3+ Children			-0.151***	(0.036)
House Value			-0.000	(0.001)
Mortgage Balance			-0.008***	(0.002)
FE	yes		yes	
Mean	0.656		0.656	
Observations	16,263		16,263	

Notes: The graph shows the results of regressions in which the outcome variable is a dummy for whether the wife is working. $DSTI^{wo}$ is the household's DSTI ratio without the wife's labor income. The regressions include age, state, household and region-year fixed effects. The sample was restricted to married households with head and wife below 60 years of age who are homeowners. Standard errors are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01).

To obtain a more direct impression of females' labor supply and income around the time of a home purchase, I estimate event studies similar to equation (3), where the event in period 0 is defined as the purchase of a home after having been a renter. All right-hand-side variables are interacted with a spouse dummy to allow a comparison between husbands and wives. The results in Figure A.2 show that women who reported a positive

labor income in the period of the home purchase even slightly *increase* their average annual hours worked after buying a house. Their average labor income also increases slightly, and evolves very similarly to that of the husbands. It should be noted that I could not detect a differential probability for the birth of a first (or an additional) child before and after a home purchase in the data. Indeed, the same data give rise to substantial and persistent drops in female income subsequent to childbirth, in line with the evidence on "child penalties" by Kleven et al. (2019). The corresponding results are available upon request.

Figure A.2: Female hours worked and income around home purchase



(a) Annual hours worked

(b) Labor income

Notes: The graph shows the result of estimating event studies similar to equation (3), where the event in period 0 is defined as the purchase of a home after having been a renter. All right-hand-side variables are interacted with a spouse dummy to allow a comparison between husbands and wives. Observations outside the estimation sample (covering the years 1969-1985) are used in computing the leads and lags. The sample was restricted to married households with a head and wife below 60 years of age who both reported positive labor income in the year of the home purchase. Standard errors are clustered at the household and state level. The whiskers indicate 95% intervals.

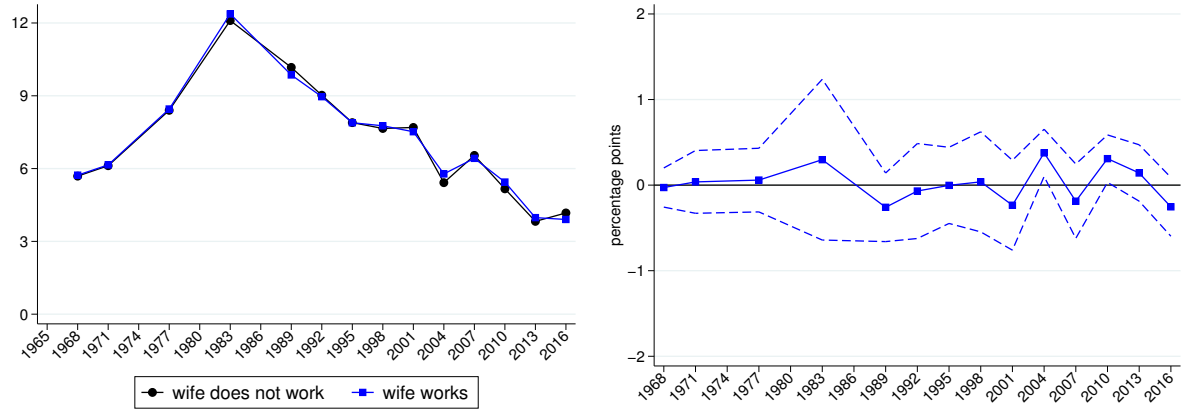
A.2 Debt service

Figure A.4a shows the average mortgage interest rates on the principal residential mortgage of married recent homeowners from the SCF+. Recent means that the household has moved into its current residence during the current or the previous two years. The graph shows that there is no systematic difference in interest rates between married households with versus without a working wife. However, households with a working wife might have different characteristics. Therefore, I regressed mortgage interest rates on observable socioeconomic variables to control for potential confounders:

$$r_{it} = \beta_0 \tilde{y}_{it} + \beta_1 h_{it} + \beta_2 d_{it} + \beta_w works^w_{it} + \sum_{t=1971}^{2016} \beta_t \cdot \delta_t \cdot works^w_{it} + \delta_t + age_{it} + kids_{it} + black_{it} + college^h_{it} + college^w_{it} + \epsilon_{it}, \tag{A.1}$$

where $\tilde{y}_{it}$ denotes log total household income, h_{it} is the asset value of the house, d_{it} is the outstanding mortgage balance, $works_{it}^{w}$ is a dummy for whether the wife has labor income, δ_t are time dummies, age_{it} is a set of age dummies, $kids_{it}$ are dummies for the number of children, $black_{it}$ is a dummy for being black, and $college_{it}^{h}$ and $college_{it}^{w}$ are dummies for whether head and wife have a college degree.[34] Figure A.4b shows the coefficients $\beta_w + \beta_t$ over time. The results confirm that there is no systematic interest rate difference between the two groups.

Figure A.3: Mortgage interest rates of recent owners



(a) Average interest rate

(b) Difference, conditional on observables

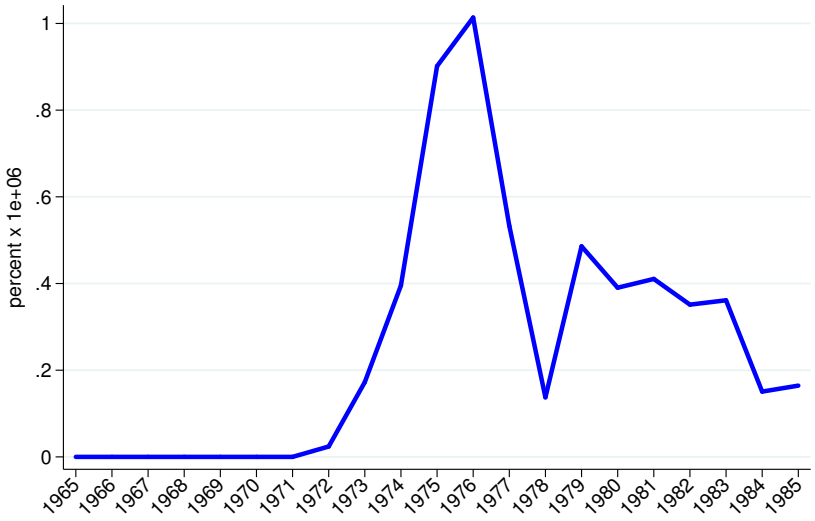
Notes: The left panel shows the average mortgage interest rate on the first mortgage of married recent homeowners (meaning they moved in the previous or current year) with and without a working wife over time. The right panel shows the coefficients $\beta_w + \beta_t$ from equation (A.1). The dashed lines show 95% CIs, based on robust standard errors taking multiple imputation into account.

A.3 Additional graphs

Figure A.4 shows how mentions of the term "women and credit" in English books have evolved over time, using data from the Google Books Ngram Viewer. This online search engine displays the frequency of search strings (*n-grams*) in millions of digitized books (Michel et al. 2011). The mention frequency is zero until 1971, becomes positive in 1972, and sharply increases thereafter.

[34] If not otherwise stated, demographics refer to the household head. Note that the SCF+ does not have a panel dimension, such that I could not include household fixed effects.

Figure A.4: Google Books Ngram Viewer

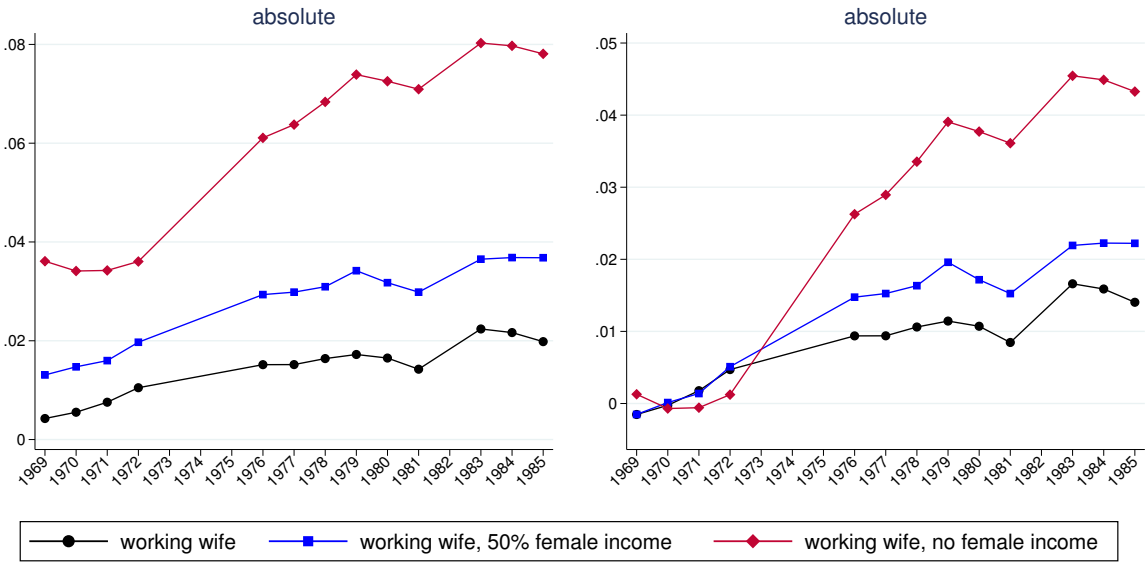


Notes: The graph shows how mentions on the 3-gram "women and credit" (case insensitive) have evolved over time. The figure is based on data from the Google Books Ngram Viewer. The y-axis shows the share of this 3-gram among all 3-grams contained in the Google sample of English books. The Google data are normalized with the total number of books published in each year.

Figure A.5: Single and married mortgage holders

Notes: The graph shows the shares of single and married households with and without a mortgage over time.

Figure A.6: Household with debt-to-income ratio above 2



Notes: The graph shows the share of households with a debt-to-income ratio above 2 among households with a working wife. Households with implausibly high debt-to-income ratios (above the 99.8th percentile) were excluded. The blue lines with squares (red lines with diamonds) show counterfactual shares based on a debt-to-income ratio excluding 50% (100%) of the wife's income. The series were smoothed by taking a 3-year moving average. The left panel shows the actual shares, and the right panel normalizes each series with its average over the period 1969-1971.

B Robustness

B.1 Point estimates with and without controls

The simplified regression equation is

$$Y_{it} = \beta_0 + \beta_1 \cdot D_t + \beta_2 \cdot D_t \cdot share_i^{pre} + \Gamma' X_{it} + \gamma_i + \delta_t + \epsilon_{it}. \tag{B.1}$$

D_t is an indicator equal to 1 for years after 1971. The other notation is the same as in equation (2). The point estimates for the housing debt-to-income ratio as the outcome variable are summarized in Table B.1.

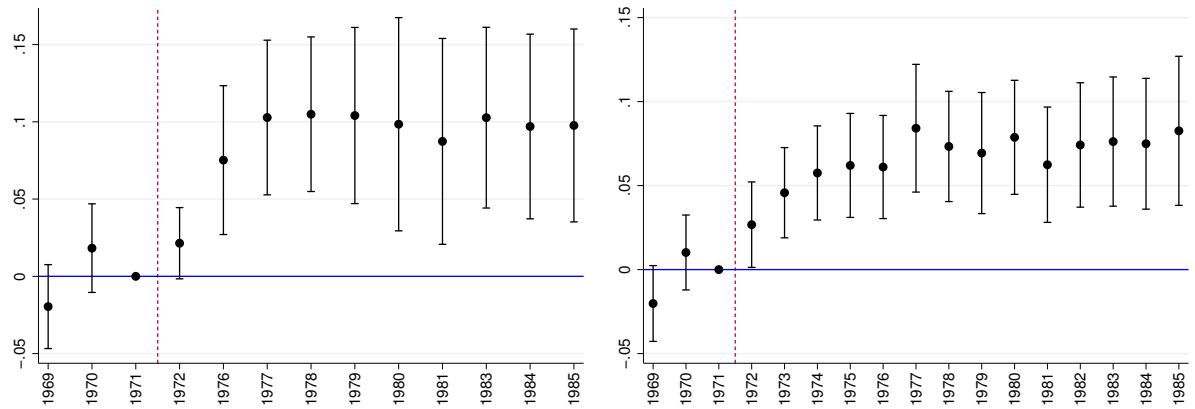
Table B.1: Housing debt-to-income ratios of married households

	(1)		(2)	
Post 1971 × Tot. Inc. Share Wife 71	0.31***	(0.08)	0.17**	(0.07)
25-34			38.60***	(4.79)
35-44			42.63***	(5.49)
45-54			39.39***	(5.64)
55-64			35.52***	(6.17)
65+			31.03***	(7.51)
50% - 90%			-10.46***	(1.23)
Top 10%			-21.25***	(2.13)
1 Child			2.94*	(1.60)
2 Children			11.80***	(1.89)
3+ Children			13.80***	(2.34)
Household FE	yes		yes	
Time FE	yes		yes	
Mean	30,302.52		30,302.52	
Observations	20188.00		20188.00	

Notes: The table presents results for equation (2), after replacing the year dummies with a dummy for the period after 1971. The interaction variable is the average share of the wife's labor income in total household income over the pre-reform years. Standard errors are given in parentheses and are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01). The wife's income share and the DTI ratio are defined in percent. The DTI ratio was winsorized at the 99th percentile within each year.

B.2 Dummy interaction

Figure B.1: Dummy interaction



(a) Mortgagor rate

(b) Homeownership

Notes: The graph presents the coefficients on the interaction term in equation (2), where $share_i^{pre}$ was replaced with a dummy for whether the average share of the wife's labor income in total household income over the available pre-reform years (up to 1971) was positive. The whiskers indicate 95% intervals.

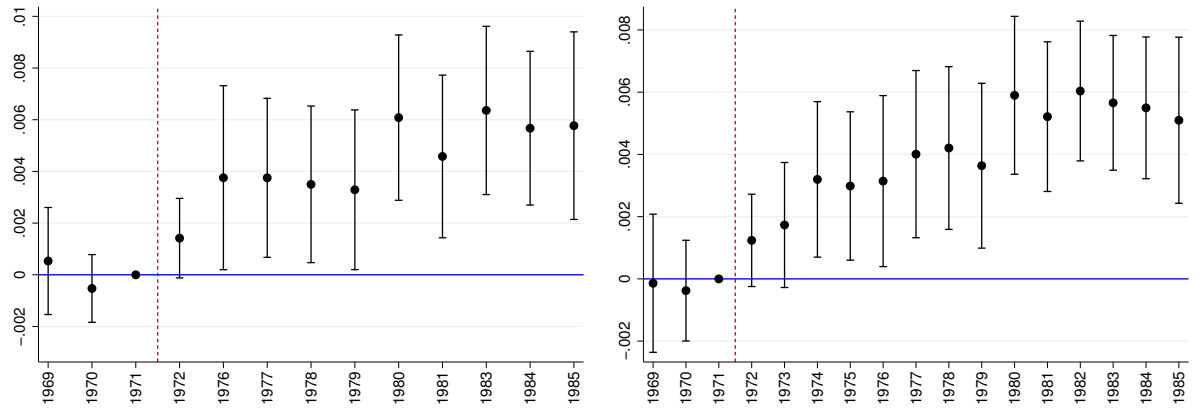
B.3 Triple difference

As explained in Section 2, income discounting was especially common when the wife was of childbearing age. Therefore, one may use older women as an additional control group in a triple-difference regression:

$$Y_{ist} = \sum_{t=1969,\, t\neq 1971}^{1985} \left[\beta_t^1 \cdot \delta_t \cdot share_i^{pre} \cdot D_i^{<35\,pre} + \beta_t^2 \cdot \delta_t \cdot share_i^{pre} + \beta_t^3 \cdot \delta_t \cdot D_i^{<35\,pre}\right] + \Gamma' X_{ist} + \gamma_i + \alpha_{st} + \epsilon_{ist}, \tag{B.2}$$

where $D_i^{<35\,pre}$ is an indicator for whether the wife was below 35 years of age in 1971. Figure B.2 plots the coefficients on the triple interaction term.

Figure B.2: Triple difference with cohort



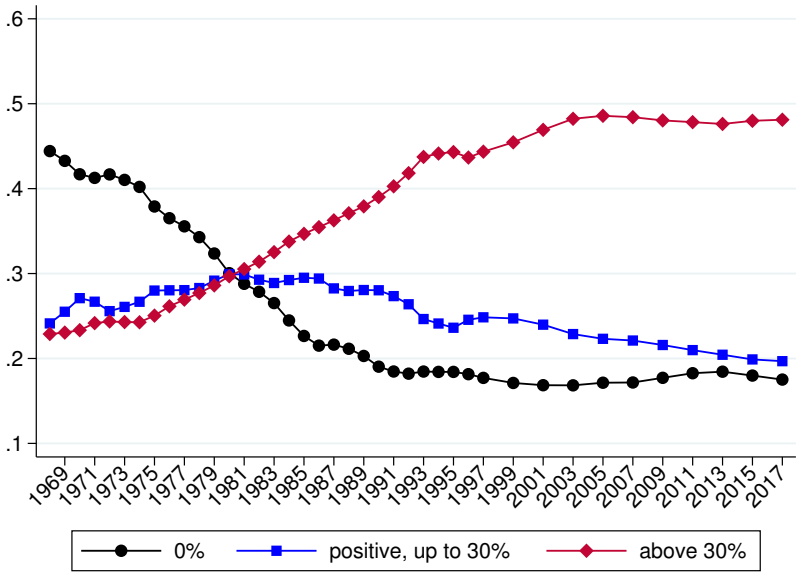
(a) Mortgagor rate

(b) Homeownership

Notes: The graph presents the coefficients β_t^1 on the triple interaction in equation (B.2). The age dummies were omitted from the controls, as this regression already includes time and cohort dummies. The whiskers indicate 95% intervals.

B.4 Share of wife in joint labor income of both spouses

Figure B.3: Shares of married households by labor income share of wife in *labor* income



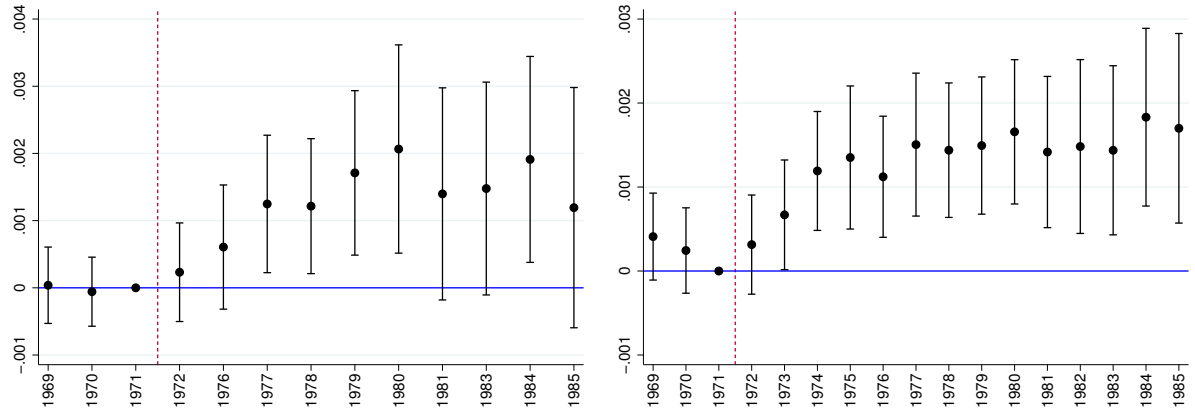
Notes: The graph shows household shares among all married households with positive labor income, stratified by the wife's labor income contribution to the couple's total labor income. Male spouses are classified as heads. The series were smoothed by taking a 3-year moving average.

Table B.2: Housing debt-to-income ratios: share in *labor* income

	(1)		(2)	
Post 1971 × Lab. Inc. Share Wife 71	0.19***	(0.05)	0.10**	(0.05)
25-34			39.02***	(4.84)
35-44			43.27***	(5.54)
45-54			40.26***	(5.75)
55-64			36.57***	(6.35)
65+			31.83***	(7.71)
50% - 90%			-10.62***	(1.25)
Top 10%			-21.45***	(2.14)
1 Child			3.05*	(1.64)
2 Children			12.05***	(1.91)
3+ Children			14.15***	(2.38)
Household FE	yes		yes	
Time FE	yes		yes	
Mean	31,194.74		31,194.74	
Observations	19567.00		19567.00	

Notes: The table presents results for a version equation (2) in which the year dummies were replaced with a dummy for the period after 1971, and the interaction variable is the wife's average share in both spouses' labor income over the pre-reform years. Standard errors are given in parentheses and are clustered at the household and state level (* p<0.1, ** p<0.05, *** p<0.01). The wife's income share and the DTI ratio are defined in percent. The DTI ratio was winsorized at the 99th percentile within each year.

Figure B.4: Share in *labor* income of head and spouse

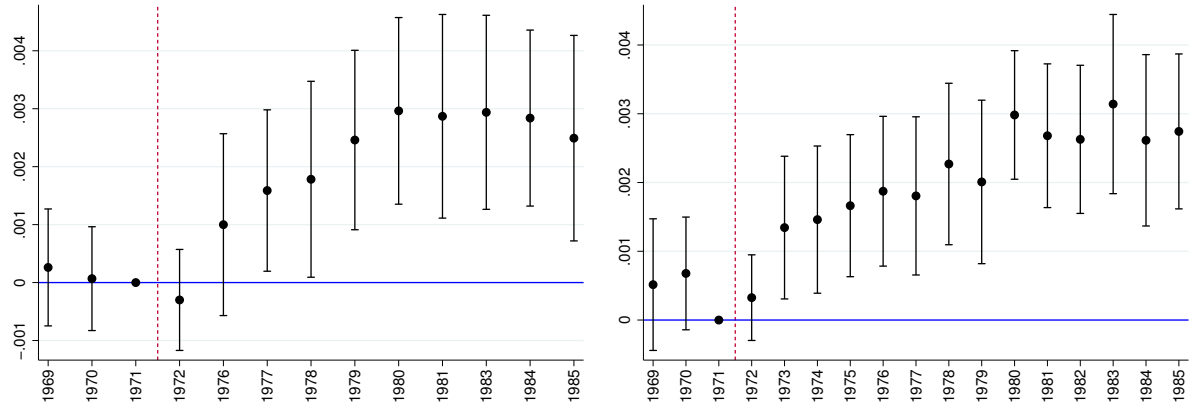


(a) Mortgagor rate (b) Homeownership

Notes: The graph presents the coefficients on the interaction term in equation (2), where $share_i^{pre}$ was replaced with the wife's average share in both spouses' labor income over the pre-reform years (up to 1971). The wife's income share is defined in percent. The whiskers indicate 95% intervals.

B.5 Share in contemporaneous income

Figure B.5: Housing debt: share of contemporaneous income

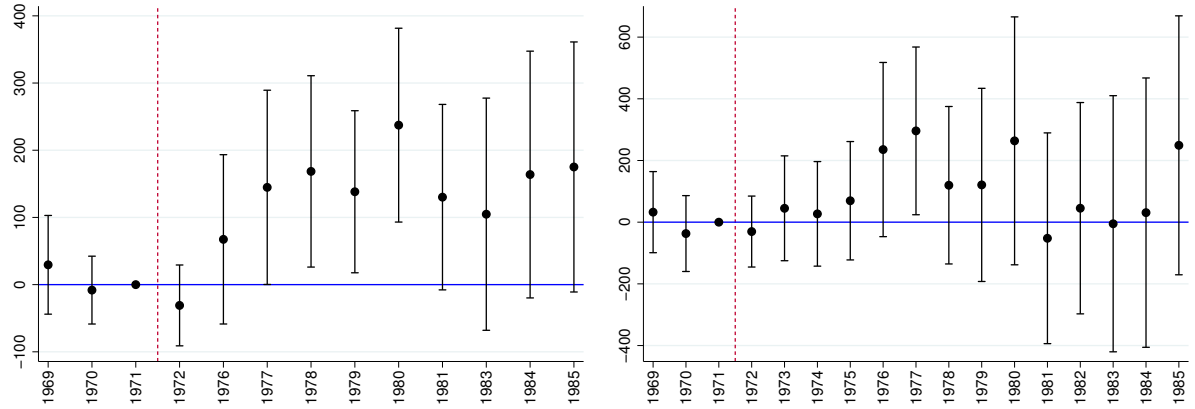


(a) Mortgagor rate (b) Homeownership

Notes: The graph presents the coefficients on the interaction term in equation (2), where $share_i^{pre}$ was replaced with the wife's contemporaneous income share (in percent). The sample consists of the same households as in the baseline. The whiskers indicate 95% intervals.

B.6 Non-normalized housing debt and housing assets

Figure B.6: Housing debt and housing



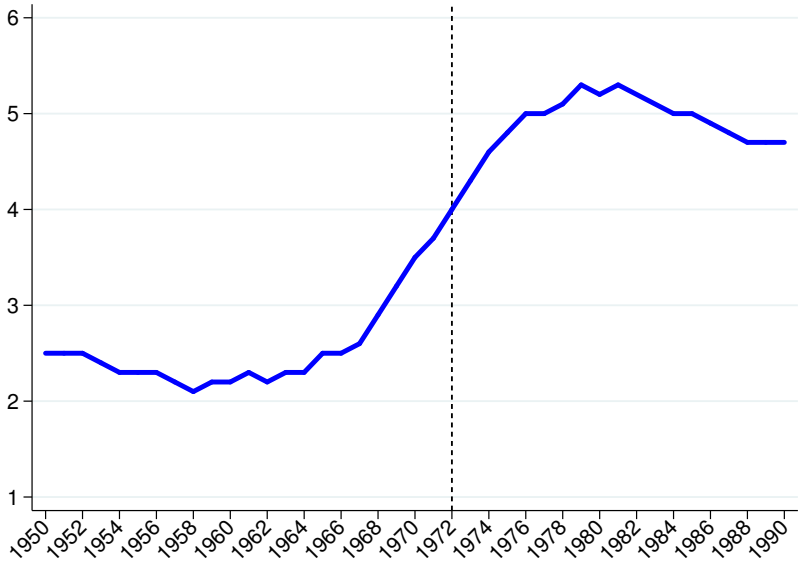
(a) Housing debt

(b) Housing assets

Notes: The graph presents the coefficients on the interaction term in equation (2). The wife's income share is defined in percent. The whiskers indicate 95% intervals.

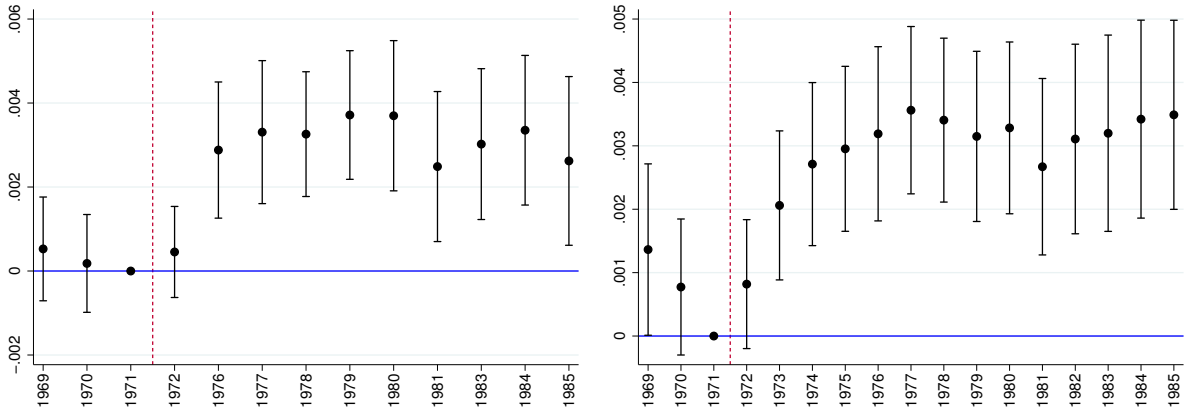
B.7 Divorce rates

Figure B.7: Divorce rates



Notes: The graph shows the number of divorces per 1,000 inhabitants based on data from the National Center for Health Statistics (NCHS). The data were made available by Randal Olson at `http://www.randalolson.com/wp-content/uploads/us-marriages-divorces-1867-2014.csv`. The black dashed line indicates the year of the first congressional hearings on equal credit opportunity for women.

Figure B.8: Excluding households who got divorced



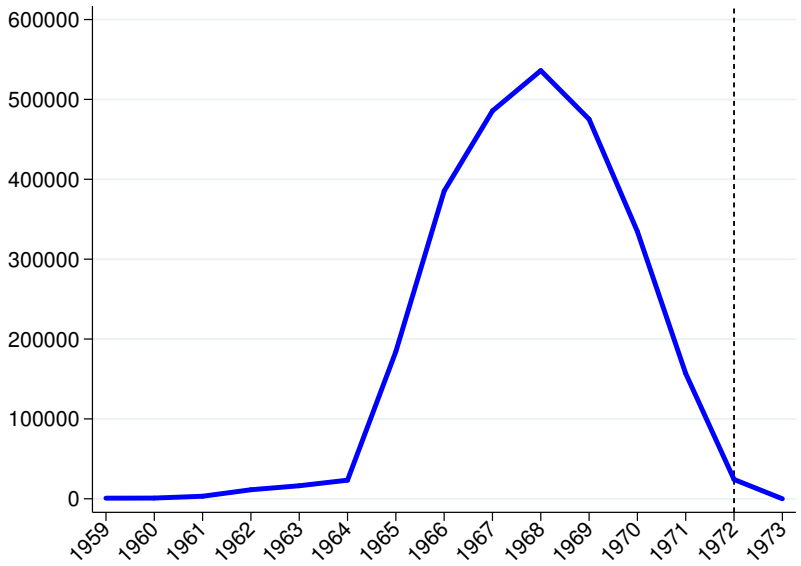
(a) Mortgagor rate

(b) Homeownership

Notes: The graph shows a robustness check for Figures 6b and 7b, estimated on a sample restricted to households who had entered the PSID at the latest in 1971, were still in the survey in 1985, and never reported a transition from being married to being single in between. The whiskers indicate 95% intervals.

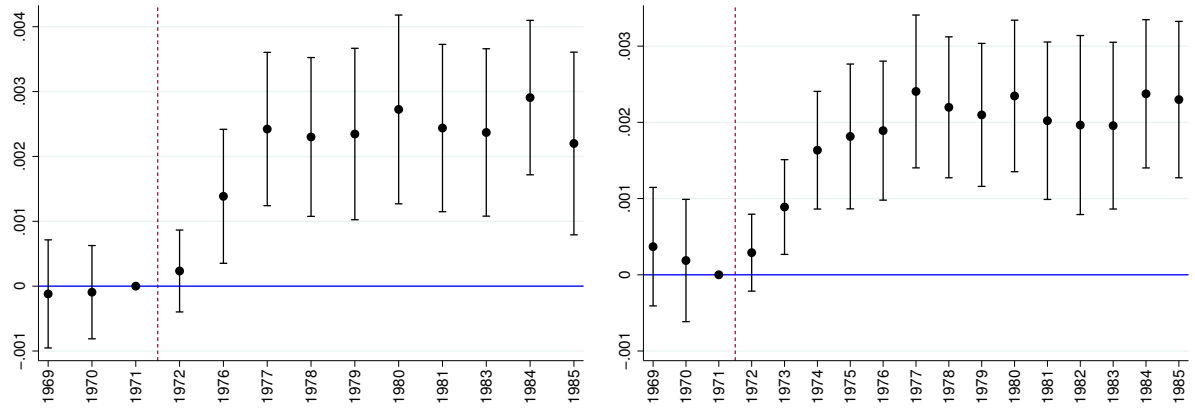
B.8 End of Vietnam War

Figure B.9: Number of U.S. soldiers in Vietnam



Notes: The graph shows the number of U.S. soldiers in Vietnam (source: `https://www.americanwarlibrary.com/vietnam/vwatl.htm`). The black dashed line indicates the year of the first congressional hearings on equal credit opportunity for women.

Figure B.10: Excluding heads in armed forces

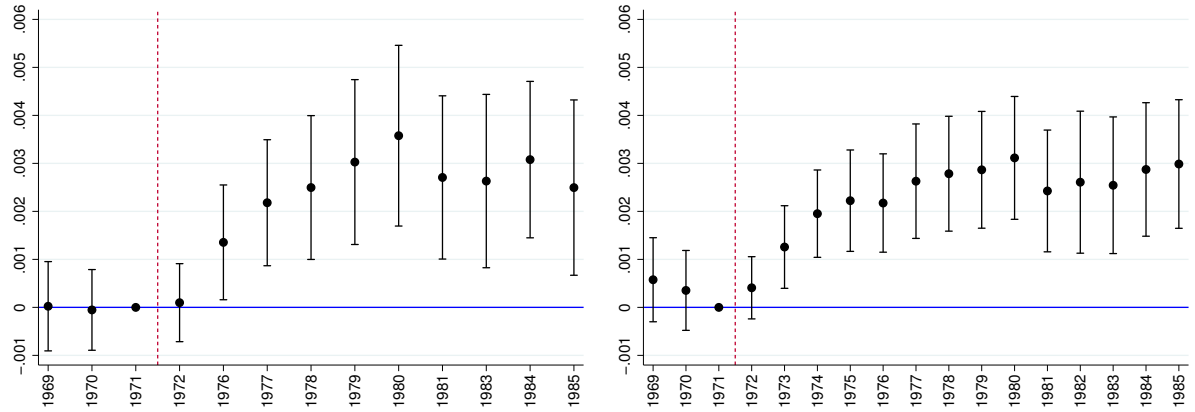


(a) Mortgagor rate (b) Homeownership

Notes: The graph shows a robustness check for Figures 6b and 7b, estimated on a sample which excludes all households whose head had been in the armed forces any time between of the beginning of the sample in 1969 and the official end of the Vietnam War in 1975. The whiskers indicate 95% intervals.

B.9 Earned Income Tax Credit

Figure B.11: Excluding households eligible for EITC

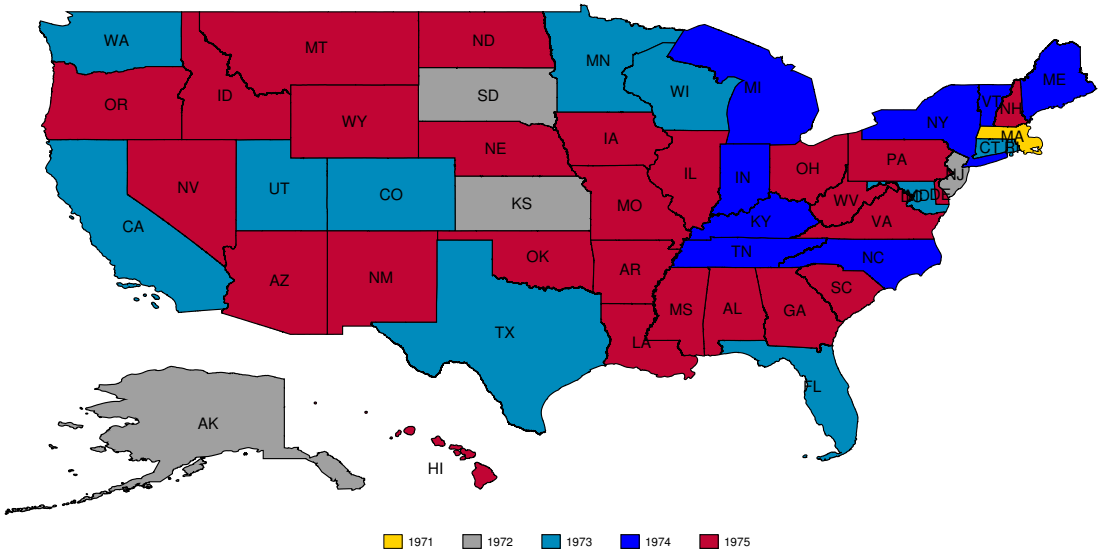


(a) Mortgagor rate (b) Homeownership

Notes: The graph shows a robustness check for Figures 6b and 7b, estimated on a sample which excludes all households who were eligible for the EITC after its introduction in 1975. The whiskers indicate 95% intervals.

B.10 State laws

Figure B.12: Geographic location of states introducing laws



Notes: The map gives a geographical overview of the states introducing legislation against discrimination in access to credit for women in a given year.

Table B.3: Overview: state laws

state	passed	effective	notes	source
Alaska	1972		does not include marital status	Gates (1974)
Arkansas*	1975		consumer credit only	Arkansas Code §4-87-104
California	1973/10		prohibits discrimination against *women*, not sex in general	Beckey (1974)
Colorado	1973/6			Beckey (1974)
Connecticut	1973/6	1973/10		Beckey (1974)
D.C.	1973/11			Beckey (1974)
Florida	1973/6	1973/10		Beckey (1974)
Georgia	1975/4			Acts and Resolutions of the General Assembly of the State of Georgia 1975, vol. 1, law no. 510
Hawaii	1975/5		only includes marital status	Session Laws of Hawaii. Act 109, H.B. no. 499
Illinois*	1973/9	1973/10	only applies to credit cards	Beckey (1974)
Indiana	1974			Bowdish (2010)
Iowa	1974	1975		Code of Iowa 1975, vol. 1, §601A.9
Kansas	1972		does not include marital status	Gates (1974)
Kentucky	1974/6			Bowdish (2010)
Louisiana	1975			Louisiana Revised Statutes, title 9, ch. 3
Maine	1974/2	1974/6		Bowdish (2010)
Maryland	1973/7			Gates (1974)

Table B.1: Overview: state laws (ctd.)

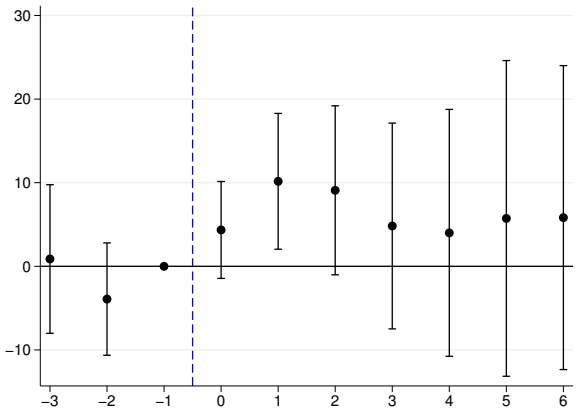
state	passed	effective	notes	source
Massachusetts	1971		does not include marital status; more general law against credit discrimination since 1973/4, but applicability to mortgages unclear	Beckey (1974)
Michigan	1974/8			U.S. Office of Consumer Affairs (1975), Michigan Penal Code §750.147a
Minnesota	1973/5	1973/8		Beckey (1974)
Missouri*	1974/6		retail credit only	Laws of Missouri: Laws Passed by the Seventy-seventh General Assembly, Missouri Digital Heritage
Montana	1975/3			Laws and Resolutions of the State of Montana, vol. 1 1975, ch. 121
Nevada	1975			Nevada Revised Statutes, title 52, ch. 598b
New Jersey	1972			Beckey (1974)
New Mexico	1975			U.S. Advisory Commission on Intergovernmental Relations (1976)
New York	1974/6	1974/7		Beckey (1974)
North Carolina	1974/4			U.S. Office of Consumer Affairs (1975)
Ohio	1975/6			"Legislative Column" (1975)
Oklahoma*	1974		consumer credit only	Oklahoma Statutes §14A-1-109
Oregon*	1973/10		public accommodation only	Gates (1974)

Table B.1: Overview: state laws (ctd.)

state	passed	effective	notes	source
Pennsylvania*	1969/6	1969/7	commercial property only	H.B. 567, Regular Session 1969-1970†
Rhode Island	1973/5			Gates (1974)
South Dakota	1972		does not include marital status	Gates (1974)
Tennessee	1974/4			Bowdish (2010)
Texas	1973/6	1973/8	does not include marital status	Gates (1974)
Utah	1973/5		does not include marital status; only state-regulated enterprises	Gates (1974)
Vermont	1974/2	1974/7		Gates (1974)
Virginia	1975			U.S. Office of Consumer Affairs (1976)
Washington	1973/3	1973/6		Beckey (1974)
West Virginia*	1973		public accommodation only	Gates (1974)
Wisconsin	1973/8			Gates (1974)

Notes: The table gives an overview of state laws against credit discrimination. If there is information that the dates of the law's passage and effectiveness differed, both are indicated. An asterisk (*) indicates laws which do not apply to home financing.
† The wording was changed from "commercial housing" to "housing accommodation or commercial property" by H.B. 141, Regular Session 1985-1986.

Figure B.13: Event study: housing-to-income



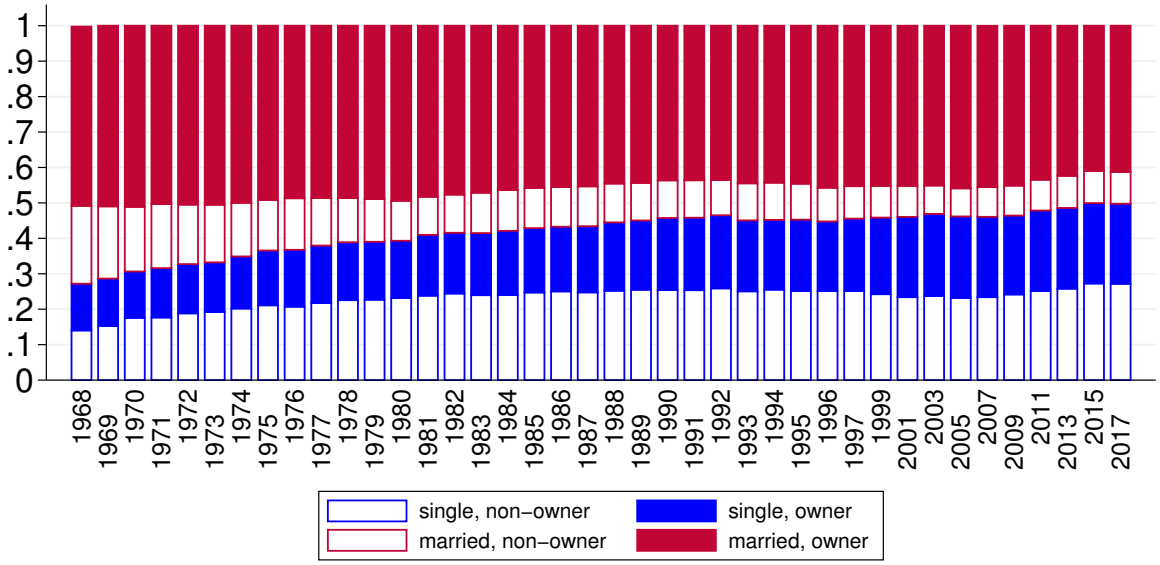
Notes: The graph shows the coefficients on the treatment indicators D^j_{st} from equation (3). The sample was restricted to households in which the wife had a positive average labor income over the three years prior to the event. Standard errors are clustered at the household and state level. Housing-to-income was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

C Results for single households

It should be noted that the ECOA does not prohibit creditors from asking about marital status in general. The only exception are applications for unsecured, separate accounts in separate property states or community property states allowing both spouses to manage and control the community property (Geary 1976). Yet as Geary (1976) points out, Regulation B limits the use a lender could make of marital status information.

One could imagine a scenario in which an increase in the share of singles with housing debt reflects demographic changes, e.g., an increase in divorces. However, the divorce rates in Figure B.7 have evolved smoothly over time. The same is true for the sample shares of single and married households, as Figure C.1 shows.

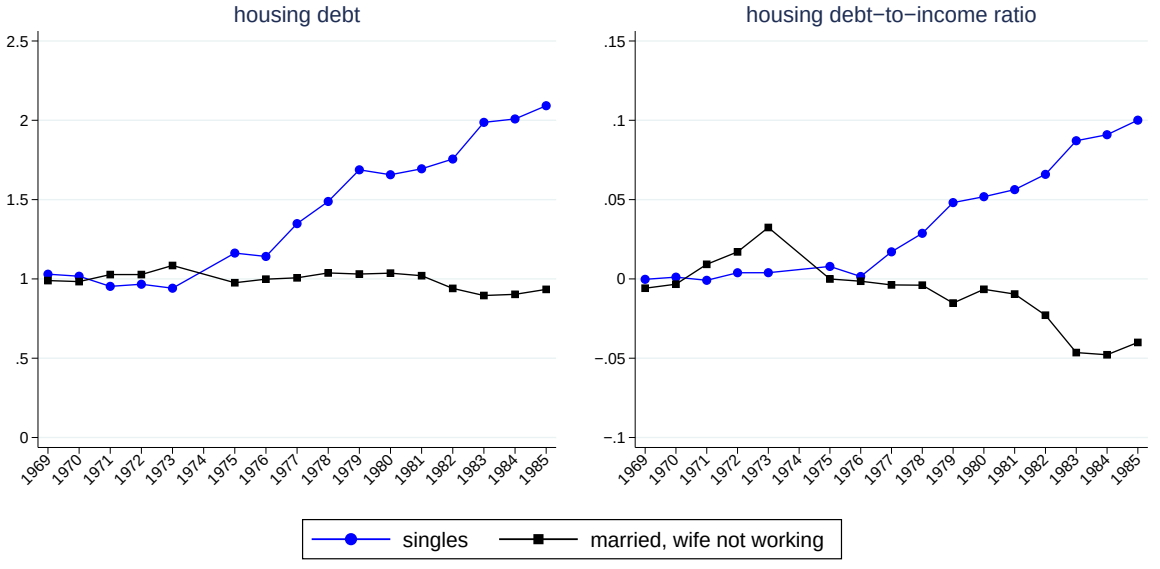
Figure C.1: Single and married homeowners



Notes: The graph shows the shares of single and married households with and without a house over time.

Figure C.2 presents descriptive evidence, similar to Figure 3 in the main text. It shows that housing debt began to increase faster for singles than for married households with a non-working wife in the early 1970s.[35] A similar pattern emerges when normalizing with total household income.

Figure C.2: Descriptive evidence, singles

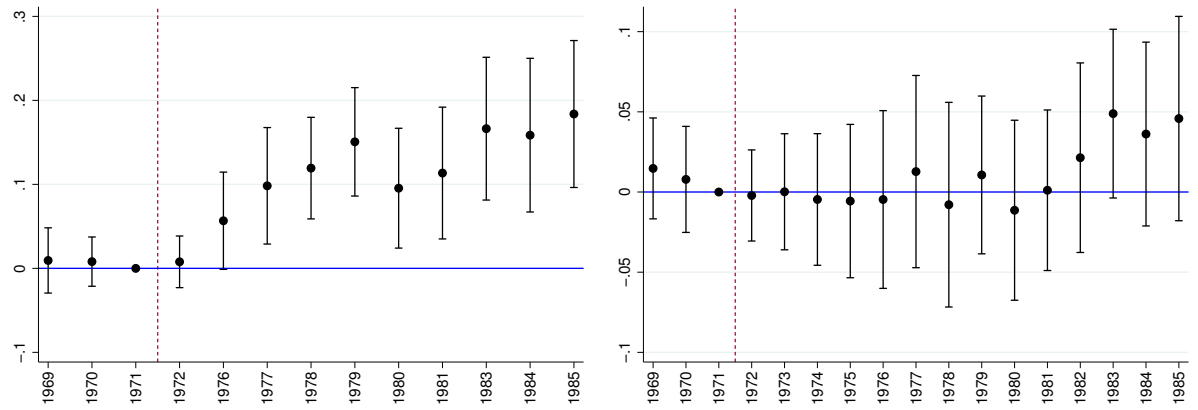


Notes: The graph shows housing debt from the PSID for singles and married households with a non-working wife over time. All series were normalized with their average over the period 1969-1971. The left panel shows average housing debt, and the right panel shows housing debt-to-income, after winsorizing at the 99th percentile within each year. The series were smoothed by taking a 3-year moving average.

[35] I excluded widowed households from the sample because they differ substantially from other single households with respect to demographic characteristics and homeownership.

I estimate a regressions similar to equation (2), replacing $share_i^{pre}$ by an indicator for being single in 1971, $single_{i,71}$. A male household head who is single in 1971 might for instance marry a working wife, such that the estimated effect might pick up effects on dual-earner couples if the treatment group was defined only according to single status in 1971. I therefore define the treatment group as single households who were also single in 1971. The control group is chosen as in the binary version of my baseline regression, i.e. married households in which the wife was not working in 1969-1971. I include the same set of controls as in the baseline.

Figure C.3: Housing debt of singles



(a) Mortgagor rate

(b) Homeownership

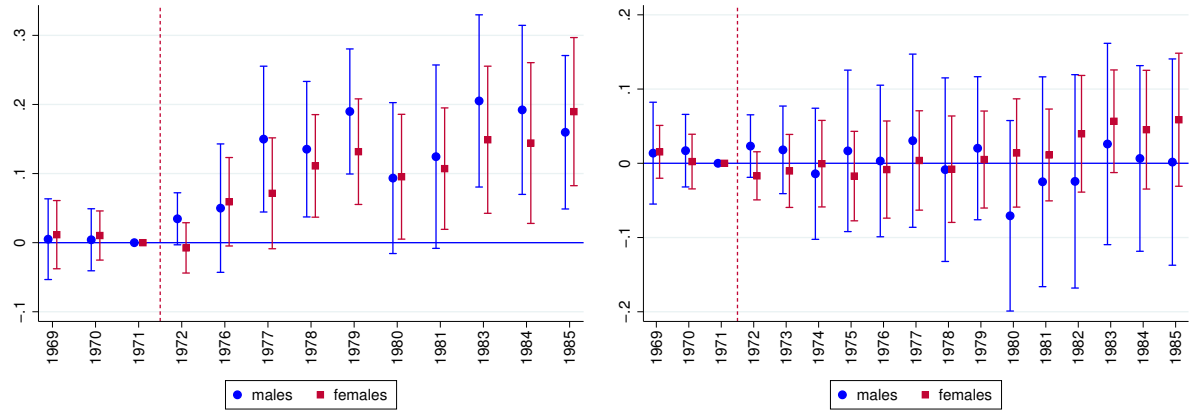
Notes: The graph presents the coefficients on the interaction term of the single dummy and the year dummy, as described in the text. The DTI ratio is defined in percent and was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

Figure C.3 shows the coefficients on the interaction term of the single dummy and the year dummy for regressions with the extensive margin of housing debt and homeownership as the outcome variables. There is a pronounced increase in the extensive margin of singles' debt compared to married households with a non-working wife. However, there is no increase in homeownership. This would be in line with the interpretation that singles could substitute away from other financial sources, such as transfers or loans from their families (cf. Del Boca and Lusardi 2003).

The PSID asks the head about financial help he received from relatives outside the household in the last year. Information on similar transfers to the wife are only available since 1985. Likewise, information on transfers from non-relatives outside the households and on loans from relatives are only available in more recent survey waves. I found that single heads had a lower probability of receiving financial support from relatives than heads from the control group in the post-reform period, whereas the difference was close to zero in the pre-reform years. Although the point estimates are not statistically significant at conventional levels, I interpret this as suggestive evidence in support of the substitution channel. The results are available upon request.

Figure C.4 stratifies the singles by sex. It shows that there is no evidence of differential effects on single women compared to single men.

Figure C.4: Housing debt of singles, by sex



(a) Mortgagor rate

(b) Homeownership

Notes: The graph presents the coefficients on the interaction term of the single dummy, the year dummy and a dummy for singles' sex. The DTI ratio is defined in percent and was winsorized at the 99th percentile within each year. The whiskers indicate 95% intervals.

D Additional information on life-cycle model

This section provides additional details on the life-cycle model and its solution.

D.1 Supplementary calculations

$$d_{j+1} = (1+r)d_j - m_j,$$

where m_j are per-period mortgage payments. The constraint $d_{j+1} \leq d_j$ implies

$$(1+r)d_j - m_j \leq d_j \quad \Leftrightarrow \quad rd_j \leq m_j \ .$$

If the mortgage is scheduled to be amortized over T periods using constant payments m, a debt-to-income constraint upon origination, is directly proportional to a debt-service-to-income constraint. To see this, let d_0 be the original mortgage upon origination.

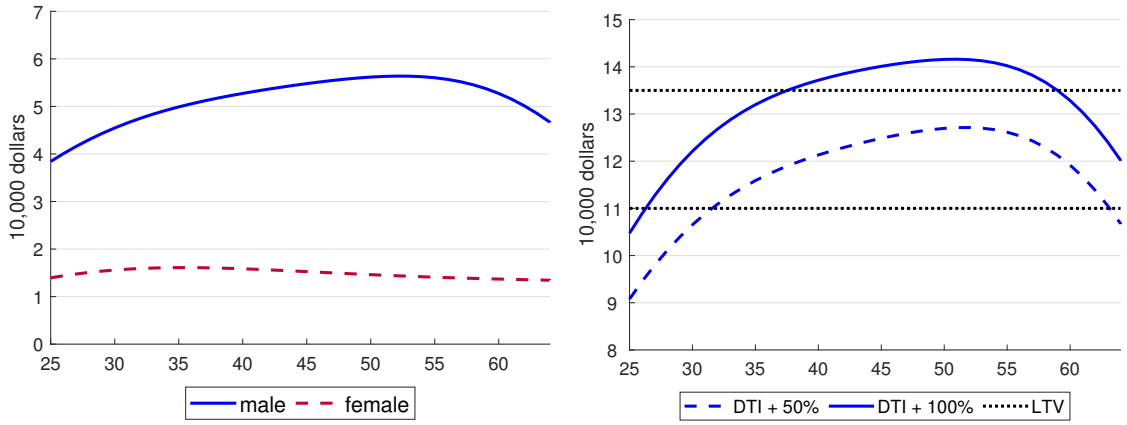
$$\begin{aligned} d_T = (1+r)^T d_0 - \sum_{i=0}^{T-1}(1+r)^i m = (1+r)^T d_0 - \frac{(1+r)^T - 1}{r} m = 0 \quad \Leftrightarrow \\ \frac{d_0}{y_0} = \frac{(1+r)^T - 1}{r(1+r)^T} \frac{m}{y_0} \end{aligned} \tag{D.1}$$

D.2 Computational solution and life-cycle profiles

As explained in Attanasio et al. (2012), the structure of the optimization problem does not allow to rely on the existence of smooth first order conditions when solving the model. Therefore, I rely on value function iteration to find a solution. I compute "conditional" value functions for each current housing state ($h \in \{0, 1, 2\}$) based on corresponding "conditional" asset grids with 120 grid points. The solution is found recursively by iterating backwards from the end of the life cycle.

The wage processes from equation (4) are discretized using the method of Tauchen (1986), as adapted to the life-cycle setup and structure of the wage process by Attanasio et al. (2012). A choice of 14 grid points (both for men and women) yields a reasonably good approximation of the autoregressive processes. Figure D.2a shows the income profiles of husbands and wives under certainty, obtained by multiplying the estimated wage profiles with 40 hours times 50 weeks for the husband, which corresponds to a typical contract in the data, and 20 hours times 50 weeks for the wife, corresponding to a typical half-time contract. Figure D.2b illustrates how these profiles map into the DTI constraint when the household is allowed to count 50% or 100% of the wife's income toward the mortgage.

Figure D.1: Income profiles and constraints



(a) Income profiles (b) Constraints

Notes: The left panel shows the income profiles from estimating equation (4) and abstracting from income risk, assuming a standard contract of 50 work weeks à 40 hours for the men, and a half-time contract of 20 hours for the woman. The right panel shows the LTV constraints associated with the smaller and the bigger house, as well as the DTI constraints when the household is allowed to count 50% or 100% of the wife's income from the left panel toward the mortgage.

The initial distribution of net wealth is estimated from the SCF+ for the period 1969-1971, restricting the sample to married households with a head between ages 24 and 26. A few households report negative net wealth in the data, mainly due to personal debt. As I my model does not include personal debt, I follow Pizzinelli (2018) and winsorize the distribution at 0. Moreover, I winsorize it at the 99th percentile to exclude a few households reporting exceptionally high net wealth. Households start their life cycle without owning a house.

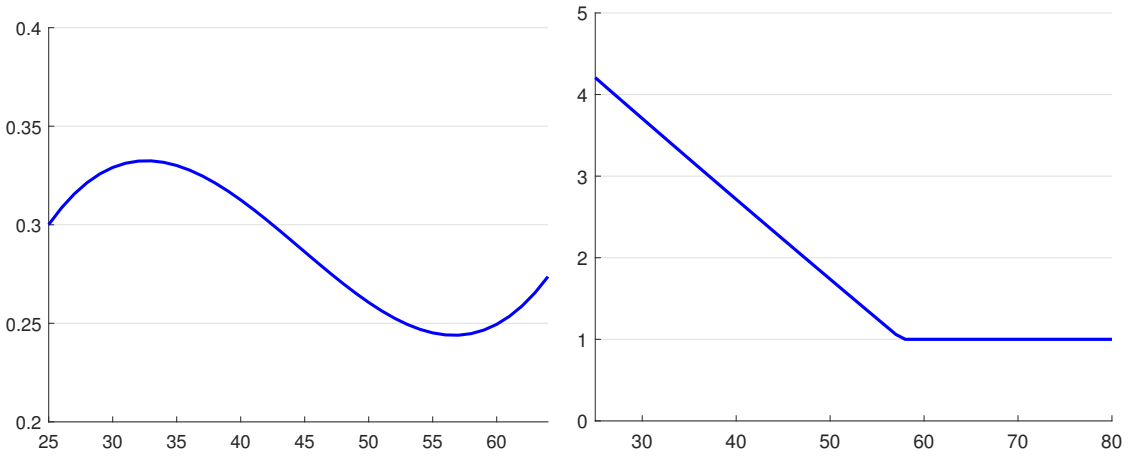
The age-dependent female leisure parameter $\theta^f(j)$ is modeled as a third-order polynomial and the factor $\chi(j)$, which pre-multiplies the basic housing preferences μ^h, is modeled as the maximum of a second-order polynomial and one. The coefficients are reported in Table D.1, and the resulting profiles are depicted in Figure D.2. The female leisure preference is initially high and increases of to the early thirties. Thereafter, the probability of additional children arriving decreases (see Figure D.4a), and women's leisure preferences decrease. From the mid-fifties on, when retirement is approaching and the first grandchildren arrive, the leisure preference increases again. The housing preferences start at a high level and then decline almost linearly until the late fifties, which is the point in the life cycle when households sizes stabilize in the data (see Figure D.4b).

Table D.1: Polynomical coefficients

$\theta^f(j)$		$\chi(j)$	
θ_0	-0.5997	χ_0	6.7559
θ_1	0.0707	χ_1	-0.1035
θ_2	-0.0017	χ_2	0.0001
θ_3	1.2748e-5		

Notes: The table shows the coefficients of the polynomials used to model the age-dependent female leisure preferences $\theta^f(j)$ and housing preferences $\chi(j)$.

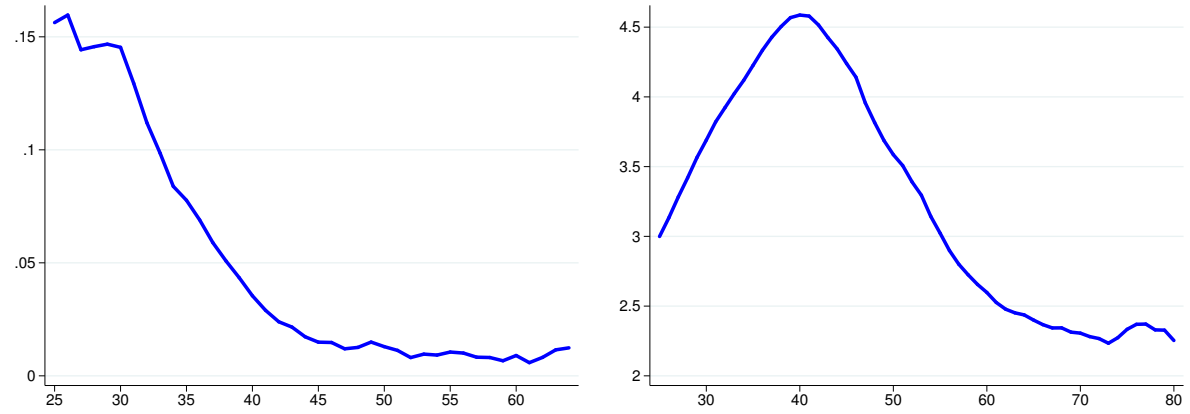
Figure D.2: Age-dependent preference parameters



(a) Profile of $\theta^f(j)$ (b) Profile of $\chi(j)$

Notes: The graph shows the age-dependent leisure preferences $\theta^f(j) = \theta_0 + \theta_1 j + \theta_2 j^2 + \theta_3 j^3$ and the housing preferences $\chi(j) = \max(\chi_0 + \chi_1 j + \chi_2 j^2, 1)$.

Figure D.3: Arrival of new children and household size over the life cycle



(a) Arrival of new children

(b) Household size

Notes: The left panel shows the share of households in the baseline sample reporting an increase in the number of children over the life cycle. The right panel shows the average household size over the life cycle. The data were smoothed by taking a three-year moving average.

Table D.2: Targeted moments

	data	model
homeownership, 25-34	0.58	0.61
homeownership, 35-44	0.78	0.78
homeownership, 45-54	0.84	0.83
homeownership, 55-64	0.8	0.83
mortgagor rate, 25-34	0.55	0.54
mortgagor rate, 35-44	0.68	0.69
mortgagor rate, 45-54	0.57	0.65
mortgagor rate, 55-64	0.35	0.29
FLFP, 25-34	0.43	0.45
FLFP, 35-44	0.39	0.36
FLFP, 45-54	0.42	0.39
FLFP, 55-64	0.39	0.39

Notes: The table compares the homeownership, mortgagor and FLFP rates by age group in the model and the data. The FLFP rate in the data refers to women working at least 500 hours per year.

E Questions related to the ECOA from the 1977 SCF

Elliehausen and Durkin (1989) draw on evidence from the Survey of Consumer Finances (SCF) of 1977, which included several questions related to the ECOA. In the following, I will summarize the answers to several of these questions. Indeed, the responses provide

mixed evidence of self-reported discrimination, consistent with the findings of Elliehausen and Durkin (1989). However, there are several reasons why the responses may not adequately reflect the impact of the ECOA. First, the survey was conducted in August and September 1977, five years after the congressional hearings of 1972 that prepared the ground for the ECOA and the abolition of Fannie Mae's recommendations to discount female incomes. Second, more than 99% of married household in the 1977 SCF have a male head (cf. Kuhn, Schularick, and Steins 2020). Questions addressed to the heads may conceal problems of their wives to obtain credit. Third, the question if a couple was unable to obtain the desired amount of credit does not capture whether they had adjusted their desired amount based on common lending practices. An important aspect of the ECOA was to educate the public about their new financial rights (Cairns 1976, Geary 1976), which may have changed households' reference points for what they can afford.

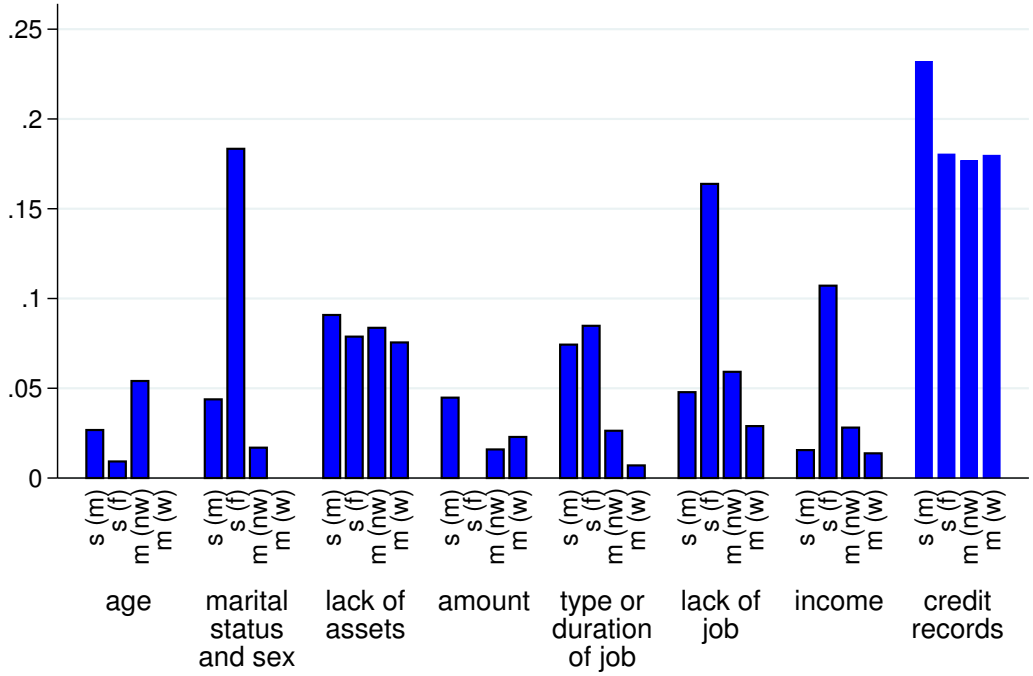
Singles, in particular women, reported larger perceived difficulties to obtain credit (see Table E.1). Looking at the reasons in Figure E.1, marital status and sex seem to be an important problem for single females, whereas these aspects are perceived as less problematic by single men, and hardly any married households report such problems. However, as the question asks for the respondent's credit experiences, it remains silent on potential problems of the spouse.

Single women also have above-average approval rates for the response options lack of job and income. This may in part reflect discriminatory practices, because lenders commonly did not accept alimony and child support as income before the implementation of the ECOA (see Cairns 1976). It may however also reflect justified economic reasons for single females' problems to obtain credit. Both male and female singles also report the type or duration of their job as a problem more often than married households. Credit records are the biggest problem for all groups, and especially for male singles. These results indicate that single households' difficulties to obtain credit were not only related to discrimination, but also to economic factors – even according to the self-perception of these households.

Table E.1: Would it be difficult for people like yourself to get credit?

	single men	single women	married, wive no work	married, wive works	Total
no	64.58	53.62	80.51	84.63	74.21
yes	31.04	43.75	17.15	14.00	23.47
depends	4.38	2.63	2.33	1.36	2.32
Total	100.00	100.00	100.00	100.00	100.00

Figure E.1: Why would it be difficult? (2 mentions possible)



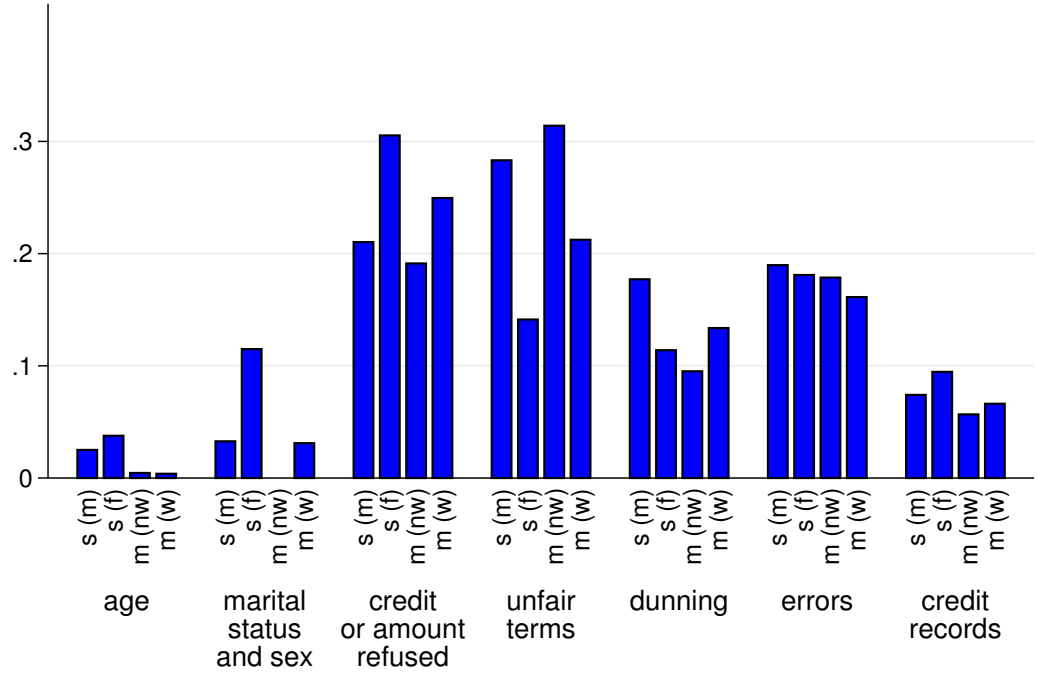
Notes: s(m) = single, male; s(f) = single, female; m(w) = married, wife s; m(nw) = married, wife does not work

When asked whether they had been treated unfairly in their credit transactions, the approval rate of singles is actually *lower* than than of married households, and that of female singles even lower than that of male singles (Table E.2). Among married households, the approval rate is slightly higher for households with a working wife, but the difference is small. Regarding the underlying problems, marital status and sex are again mainly mentioned by single females (Figure E.2). Overall, the share of households mentioning this source of the problem is small. Interestingly, the share of households reporting they were refused all or part of the desired amount is higher for single females than single males, and higher for married households with a working as opposed to a non-working wife.

Table E.2: Have you been treated unfairly in your credit transactions?

	single men	single women	married, wive no work	married, wive works	Total
no	76.35	81.44	75.07	72.56	75.88
yes	23.65	18.56	24.93	27.44	24.12
Total	100.00	100.00	100.00	100.00	100.00

Figure E.2: What was the problem? (2 mentions possible)



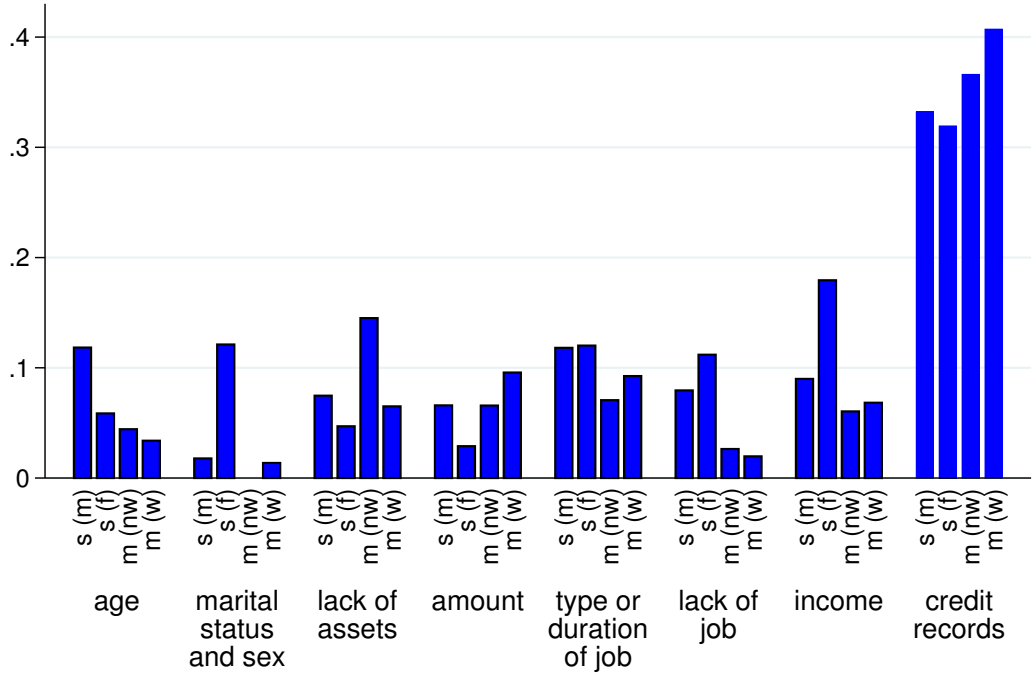
Notes: s(m) = single, male; s(f) = single, female; m(w) = married, wife works; m(nw) = married, wife does not work

Consistently, the share of households reporting they were turned down for credit is higher among households with a working as opposed to a non-working wife (Table E.3). However, it is lower for single females than for single males. Among the reasons, marital status and sex are once more mainly reported by single females, and do not play a big role (Figure E.3). Again, credit records are the biggest problem, this time with the largest response rate among married households with a working wife.

Table E.3: Have you been turned down for credit?

	single men	single women	married, wive no work	married, wive works	Total
no	77.97	82.34	86.96	83.04	83.56
yes	22.03	17.66	13.04	16.96	16.44
Total	100.00	100.00	100.00	100.00	100.00

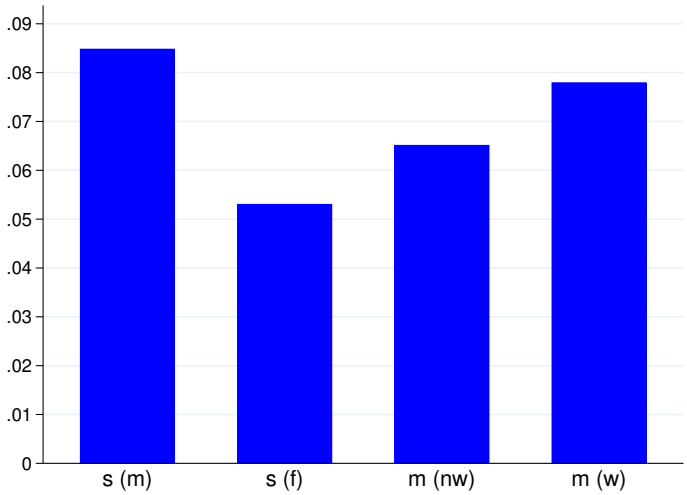
Figure E.3: Why were you turned down? (2 mentions possible)



Notes: s(m) = single, male; s(f) = single, female; m(w) = married, wife works; m(nw) = married, wife does not work

When asked specifically whether they had been unable to get as much credit as they wanted from a particular lender in the past few years, the share of affirmative answers was larger among married households if the wife was working, yet lower than among single men (see Figure E.4). However, as discussed in the main text, this question does not capture whether households have calculated the desired amount based on discriminatory market practices.

Figure E.4: Were you unable to get as much credit as you wanted from a particular lender in the past few years?



Notes: s(m) = single, male; s(f) = single, female; m(w) = married, wife works; m(nw) = married, wife not working