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ABSTRACT

Great Depression and the Rise of Female Employment: A New Hypothesis

The cohorts of women born at the turn of the 20th century increased markedly their participation in the labor market when older. These are the first cohorts who worked after their childbearing years. In this paper, we document a link between their work behavior and the Great Depression. We show that the 1929 Crash attracted young women 15 to 34 years old in 1930 (whom we name D-cohort) into the labor market, possibly via an added-worker effect. Using several years of Census micro data, we further document that the same cohort remained or re-entered the labor market in the 1940s and 1950s and that its entire life cycle labor supply is tightly linked to the conditions dating back to the Great Depression. We argue that these facts are consistent with the hypothesis of a labor supply shift for this cohort triggered by the 1929 Crash.

JEL Classification: J21, N32, J01

Keywords: Great Depression, added worker effect, female labor supply

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I. Introduction

A. Outline

Female labor force participation increased slowly from 1880 to 1940, more sharply between 1940 and 1960 and at an accelerating pace thereafter (Smith and Ward, 1985). Till the 1920s, working women were generally young and unmarried; they also almost always exited the labor market upon marriage (see Goldin, 1990 and Costa, 2000). Among white women, the cohort born between 1896 and 1915 is the first to change the distinct pattern of permanently exiting the labor market after marriage. Figures 1a and 1b illustrate the work shares of this cohort between 1930 and 1970 (solid black line) as well as those of older cohorts (green dotted lines). We also report the same shares for each decade using 10-year age brackets to avoid overlap of cohorts across decades (dotted black line). As can be seen, in contrast to previous decades and cohorts, these women dramatically increased their labor supply over their lifecycle and kept working till their mid-60s. Moreover, this is the first cohort to remain or re-enter the labor market past its childbearing years.[1] To give an idea of their unprecedented entry: in 1960 they were 45 to 64 years old and 41% of them were still working, while in 1940 only 20% of women in that age bracket were working. Finally, another feature of this cohort is that, while it overall decreased its participation in the labor market between 1930 and 1940, married women increased it (see Figure 1b).

In this paper, we document a significant link between the entry and/or re-entry patterns of this cohort and the severity of the Great Depression.[2] Using several cross-sections of IPUMS microdata and changes in state-level business failure rate as our baseline measure of economic conditions, we find that these women entered into the labor market during the 1930s and remained or re-entered in the 1940s and 1950s significantly more in states that were more negatively impacted by the Great Depression. We also find a persistent negative link between its severity and their wages in the 1950s, which suggests that their entry was the result of a labor supply shift. Our estimates also suggest that improvements in the current state of the economy reinforced these long-term entry/re-entry patterns but

[1] The immediately older cohort (35 to 44 years old in 1930) also re-enters when older but to a much lesser degree.

[2] Goldin (1998) already documented the large shift in the participation of older women, including the fact that it was much more pronounced than for younger cohorts after 1940 (also see Smith and Ward, 1985). She attributes these changes to a shift in labor demand between 1940 and 1960. Lower fertility and the diffusion of new home technologies were additional contributing factors (Greenwood et al, 2005).

did not affect the impact of economic conditions dating back to the early 1930s. We refer to women born between 1896 and 1915 as the *D-cohort* to emphasize the role of the Depression years on their work decisions.[3]

Figure 1a: Female Employment by Age
(white nonfarm women)

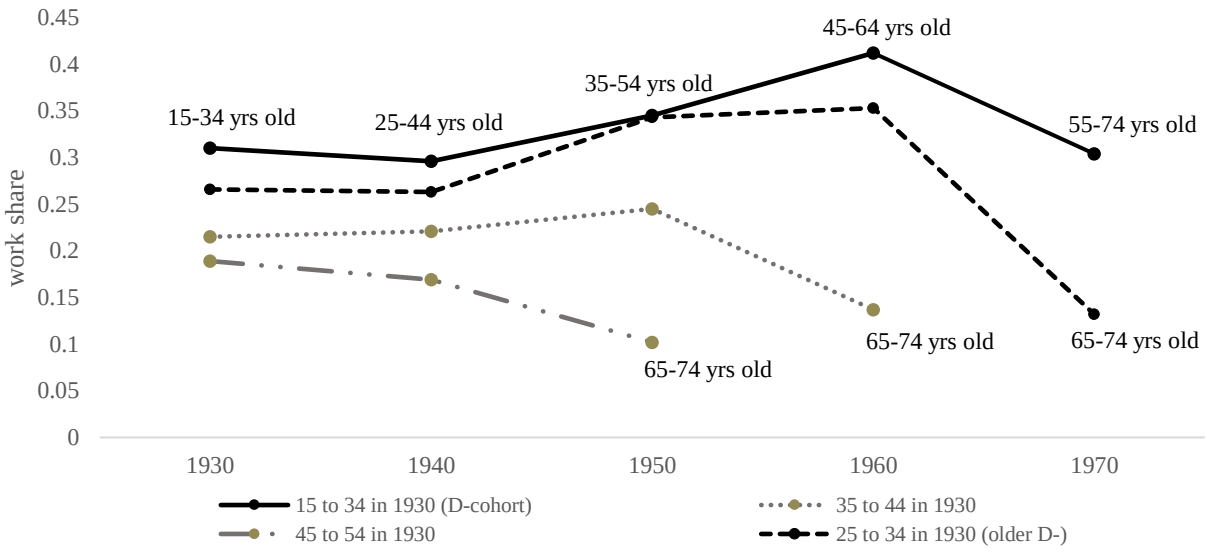
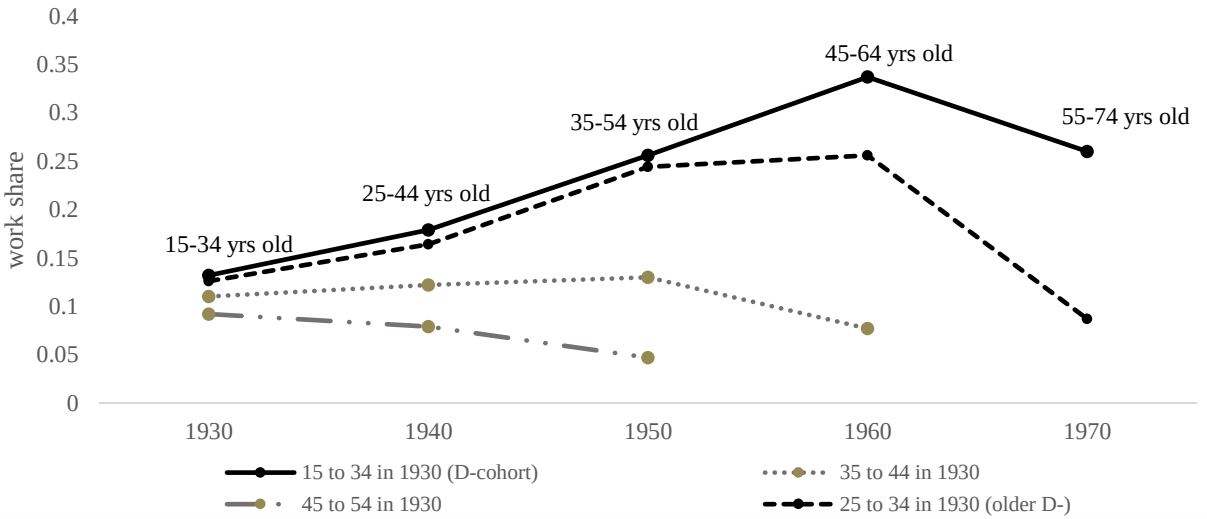


Figure 1b: Female Employment by Age
(white married nonfarm women)



The paper is organized in three parts. *In the first part*, we use several pooled samples of micro data from 1910 to 1960 to examine the work patterns of women in the *D-cohort*

[3] As shown in the results section, we find that slightly younger women 20 to 24 years old in 1940 and born between 1916 and 1920 also modified their labor supply in response to the shock of the Great Depression. These women turned working age in the early 1930s.

in response to economic conditions during the early Depression years. We show that in states where the Great Depression was most severe:

a) women in this cohort were working significantly more in 1940;

b) the same birth cohort had significantly higher employment rates and worked more weeks and hours in 1960, when 45 to 64 years old, relative to women of the same age in 1940 or in earlier decades.

c) the same cohort of women had significantly lower wages in 1960, when 45 to 64 years old, relative to women of the same age in 1940.

In the second part of the paper, we perform a robustness analysis for the findings above. First, we use several alternative measures of the severity of the Great Depression: from state-level aggregate measures of the decline in the manufacturing sector during the early part of the 1930s to county and SEA-level data on bank deposit suspensions. Second, we use the 1940-1950 pooled samples to examine whether the patterns found hold when the *D-cohort* was a decade younger. Third, to assess the robustness of our results to the choice of 1940 as our base year and to the existence of pre-trends in female employment, we supplement the 1940-1960 pooled samples with the 1910 and 1930 cross-sections. Fourth, to further address identification concerns, we examine whether the expansion of the white-collar sector and of home technologies in the first part of the century (Goldin, 1990 and 1998a) could be driving the results. We additionally use a Bartik-type instrumental variables strategy to correct for possible endogeneity problems. Finally, we conduct a falsification exercise examining whether our baseline Depression measure can predict higher labor force participation of women in pre-Depression decades. In all cases, our findings remain intact and support the hypothesis that the Great Depression had long-lasting effects for this particular cohort. Finally, as an external validity check, we use an alternative source, a 1978 survey (Ridley, 1978) which asked ever married women born between 1901 and 1910 questions relating to the Great Depression. The sample is small, 1049 women, but worth examining given the kind of questions asked. We find a strong positive link between the number of years these women worked and the impact of the Great Depression on their family incomes.

In the third part of the paper, we examine one plausible channel via which the Great Depression may have affected the work behavior of this cohort. We investigate whether men who (based on their age) could have been married to women in the *D-cohort* experienced long-term wage declines in states that were more severely hit by the Great

Depression. Men who were of working age at the time of the Crash directly faced persistent unemployment in the 1930s. Employment gaps, absence of opportunities, human capital depreciation may have entailed re-employment of men in lower paying occupations and reduced households' permanent income. In line with this hypothesis, we find that wages of men 45 to 64 years old in 1960 were significantly lower in 1960 in states more impacted by the Crash.

The paper proceeds as follows. Related literature is discussed in the rest of this introduction. Part II describes the data. Part III tests our hypothesis and Part IV provides robustness checks. Part V discusses the occupations these women entered, while Part VI presents suggestive evidence of long-term declines in husbands' permanent income due to the Great Depression. Part VII concludes.

B. Related Literature

Goldin (1990 and 1998a) attributes the increase in married women's labor market participation in the first part of the century to a labor supply shift and the increase that occurred between 1940 and 1960, to the expansion in the demand for office and other clerical work.[4] This, together with the raise in high-school enrollment/graduation rates between 1910 and 1940 (Goldin, 1998b) created opportunities for women in white-collar occupations where it was easier to reconcile work and marriage. Women in these occupations remained employed after marriage, leaving their job once their first child was born and re-entering when their children started school.[5] It is during this period (1940-1960) that we observe a sharp increase in the labor force participation of the *D-cohort*. Our results show that favorable contemporaneous economic conditions played an important role, which is consistent with the hypothesis of a labor demand shift (Goldin, 1990). However, even after controlling for contemporaneous economic conditions, conditions *during the Great Depression* significantly increased the employment shares of these women in 1950 and 1960.

The most well-known hypothesis that could explain the increase in women's labor market participation in response to large negative income shocks is the *Added Worker Effect* whereby a decrease in family income in presence of credit market constraints,

[4] Empirical studies examining the impact of WWII report no significant effects of the war on older women and that the effects of the war faded in the 1950s (Goldin 1991, and Acemoglu, Autor, and Lyle 2004).
[5] On the supply side, time-freeing technological changes in home production also made it easier for women to remain or re-enter the labor market.

implies an increase in wives' labor supply. Our cohort was 14 to 33 years old in 1929, at the time of the Great Crash. Many women in this cohort were married and starting a family. The decline of family income may have led them to enter the labor market to offset family income or asset losses.

Overall, the early empirical literature does not provide strong support for the added worker effect. Mincer (1962), using data from the 1950 BLS Survey of Consumer Expenditures and other Census sources, finds a negative link between wives' labor supply and transitory income changes that is stronger than the link to permanent income changes. He also finds that the response to transitory changes tends to fade over time. Heckman and MaCurdy (1980) find instead no significant effects of husbands' unemployment on their wives' labor supply. Lundeberg (1985) emphasizes the role of employment uncertainty and credit constraints in generating an added worker effect. Finegan and Margo (1994) provide evidence of an added worker effect in the late 1930s, which is not detectable if men on work relief are counted among the unemployed. They calculate that in 1940 the participation of women whose husbands were unemployed (and not on work relief) or out of the labor force, was higher than that of women whose husbands were employed in the private sector.

More recent studies using micro-data provide evidence in favour of an added worker effect for different periods and countries. Using several waves from the Panel Study of Income Dynamics (PSID), Stephens (2002) finds significant and persistent increases in women's labor supply in response to their husbands' job loss.[6] His estimates suggest that permanent income losses can have persistent effects. Kawano and LaLumia (2014) also detect an added worker effect using data on U.S tax returns. Morissette and Ostrovsky (2008) use a large Canadian longitudinal dataset based on tax records for family and individual annual earnings that covers the 1987-2001 period. They find evidence that, among families with no children, wives' earnings offset about one fifth of their husbands' income losses five years after the layoff. Gong (2010) uses several waves from the Australian HILDA Survey and finds a significant added worker effect both at the extensive and at the intensive margins. His data cover the years that followed the 2008

[6] There is a growing literature on the role of families to insure labor income shocks. Blundell, Pistaferri and Saporta-Eksten (2012) estimate a life cycle model with two earners and find strong evidence of smoothing to male's permanent shocks to wages. It though important to point out that policy changes (such as adjustments in unemployment insurance) can mitigate increases in spousal labor supply in response to the other spouse's unemployment spells (Gruber and Cullen, 2000).

global financial crisis. Ayhan (2015) uses micro-data from Turkey to examine the impact of the post-2008 crisis on wives' employment. His findings suggest that in the short-term there is a 29% higher probability that wives enter the labor market in response to their husband's unemployment. Finally, Bredtmann, Otten et Rulff (2014) use longitudinal data from the European Union Statistics on Income and Living Conditions (EU-SILC) for 28 European countries covering the period 2004 to 2011 and also provide evidence of an added worker effect.

Recent evidence seems therefore favorable to the added worker effect, though there are no studies on the long-term impact of large, negative and persistent shocks such as the Great Depression.

II. Data and Descriptive Statistics

Our main data source is the 1% IPUMS files, between 1910 and 1960 (Ruggles et al., 2010). We use this data to obtain micro-level information on labor supply, wages and other characteristics. Our main analysis focuses exclusively on white women born in the United States, not residing in farms and not in group quarters. Finally, unless otherwise specified, we match all state variables detailed below by the woman's state of birth and we use the appropriate sampling weights. We relax though this assumption when performing robustness exercises.

A central issue in our analysis is how to consistently measure changes in economic conditions during the first half of the century. Unemployment is not available annually before 1961, while information on income is not available prior to 1929.[7] The only measure we are aware of, that is both at state and annual level since the start of the century, is the ratio of industrial and commercial failures to business concerns (*U.S. Statistical Abstracts*) collected yearly by *Dun and Bradstreet Inc.*, NY (henceforth referred to as *business failures*). The number of business failures includes concerns involved in court proceedings or voluntary actions likely to end in losses to creditors. They cover manufacturers, wholesalers, retailers, building contractors, and certain types of commercial service, but do not include finance, insurance, and real estate companies, nor railroads and steamship lines amusement enterprises. Failures increase in response to large and persistent shocks rather than to transitory shocks. They are also more akin to labor

[7] State-level unemployment rate is reported every 10 years until 1960 by the census and can be calculated annually since 1962 from the Current Population Survey. Due to changes in the employment definition, however, unemployment rate estimates from the census before and after 1940 are not strictly comparable.

demand shifts that lead to layoffs than to labor supply shifts. Unemployment rate is instead affected by shifts in both labor demand and supply.

Figure 2 plots the nationwide rate of business failures against annual real GDP since the start of the century. Overall, the business failure rate captures the major recessions in the aggregate income series. There are more failures in the early 1930s and very few during WWII, while the economic boom of the 1950s is also characterized by fairly low levels of business failures.

In Table 1 we examine how several economic and demographic factors measured in 1920 (pre-Depression) are associated with business failures in 1930, at the onset of the Depression. As can be seen, the size of the manufacturing sector and state income (approximated by occupational scores) are positively linked to business failures. Pre-depression female labor force participation rate is instead uncorrelated with the 1930 failure rates. The fact that states with a larger concentration in manufacturing experienced a higher failure rate in 1930 is not surprising given that the business failure rate is calculated over the universe of concerns that largely pertain to the manufacturing sector. [8]

In the robustness section, we consider several other measures of the economic downturn as alternatives to the business failure rate. The *Census of Manufactures* (1935) reports various state-level statistics for the manufacturing sector at biennial frequency between 1927 and 1935. We use the number of establishments, the number of wage earners and wages to construct measures of the dramatic decline of the manufacturing sector in the early 1930s. We also use historical data from Fishback on state per capita real income from 1919 onwards to capture the drop in consumer's purchasing power induced by the Depression.

Finally, we use information on suspended bank deposits and suspended banks to construct *county*-level measures of banking distress: the change in the share of banks and bank deposits that were suspended between 1926 and 1929. We view these as alternative indicators that capture the extent of the economic crisis due to the fragility of the local banking system. This data is available from the Board of Governors of the Federal Reserve System (the *Federal Reserve Bulletin*) which reports the number of banks

[8] The IPUMS provides no information on income prior to 1940. In absence of income information, occupational scores are used as a proxy. We found no association between employment shares in other sectors of the economy in 1920 and business failures in 1930. All statistics are calculated across the state population aged 20 to 64 using IPUMS USA data.

Table 1: 1920 state-level determinants of business failures in 1930

Dependent variable:	state business failure rate in 1930					
	(1)	(2)	(3)	(4)	(5)	(6)
employment share in manufacturing	1.49	1.53	1.52	1.69	1.03	1.47
	(0.49)***	(0.51)***	(0.52)***	(0.51)***	(0.55)*	(0.63)**
share nonwhite		0.12	0.11	0.66	1.05	0.75
		(0.36)	(0.48)	(0.78)	(0.85)	(0.76)
labor force participation of non-farm			0.028	-0.40	-1.20	-0.75
women			(0.80)	(1.03)	(1.27)	(1.13)
share literate				1.17	0.54	-0.072
				(1.41)	(1.28)	(1.222)
male occupational scores					0.066	0.22
					(0.028)**	(0.12)*
employment share in agriculture						2.77
						(2.05)
	49	49	49	49	49	49

Notes: OLS coefficients from regression of the state business failure rate in 1930 on the listed state covariates. State covariates reflect means calculated from the 1920 IPUMS Census. State business failure rates are obtained from the Annual Statistical Abstracts of the United States. ***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

between 1920 and 1936 closing temporarily or permanently on account of financial difficulties. A suspended bank closed its doors to depositors and ceased conducting normal banking business for at least one business day. Declining asset values and bank runs were the principal cause of bank suspensions. Between 1929 and 1933 most suspensions became permanent and indicate loss of assets (see Richardson, 2006). As detailed county information is not available after 1940 in the IPUMS, we will only use the county-level measures in the short-run analysis (1930-1940 pooled sample) and use SEA-level (State Economic Area) aggregates in order to examine the long term effects of bank suspensions (1930-1940-1950 pooled samples).[9] Bank suspensions and closures could have directly affected households' finances and therefore their work behavior.[10]

III. Great Depression, Work and Wages

In this section we examine the short and long-term impact of the Great Depression and of the subsequent economic recovery on female labor markets.

A. Female Labor Supply in the aftermath of the Great Crash

We pool the 1910-1930-1940 cross-sections in order to study the short-term work responses to the shock of women in various age groups in 1940 relative to those of women in the same age groups in 1930 and in 1910. We consider all women of working age in

[9] There is no SEA information after 1950 in the IPUMS USA.

[10] As for business failures (Table 1), 1920 female participation rates do not predict any of the alternative measures we use to capture the Great Depression.

1940 and separate them in six groups on the basis of their age: 15 to 19, 20 to 24, 25 to 34, 35 to 44, 45 to 54 and 55 to 64 years old. Women 25 to 64 years old in 1940 were of working age in 1930, and hence their labor supply could have been affected by the initial shock *directly*. Women 15 to 24 years old in 1940 were instead too young to work at the time of the Crash but could have entered the market later in the 1930s, when the initial shock had begun to fade.

We estimate versions of the following baseline specification:

$$y_{it,A} = \alpha_0 + \alpha_1 CC_{s',t} + \alpha_2 CC_{s',t} \cdot d_{1930} + \alpha_3 frate\_GD_{s,t} \cdot d_{1940} + \alpha_4 frate\_GD_{s,t} \cdot d_{1930} + \alpha_5 X_{it} + f_{s,s'} + g_t + z_{s,t} + h_{s,1910} \cdot d_t + \varepsilon_{it} \qquad (1)$$

y_{its} is an indicator for whether woman i in age group A is currently employed in year t.[11] The variable $CC_{s',t}$ captures the effect of current economic conditions measured at the individual's state of residence and is interacted with a dummy for the year 1930. [12] The variable that accounts for the economic environment during the Great Depression is measured by the change (increase) between the business failure rate during the Crash and the failure rate in a reference pre-Depression year, which is 1910. More specifically, labor supply in 1940 is allowed to be affected by the change between the average failure rate during the early years of the Crash (1929 through 1932) and the average failure rate in 1910 (base year, average of 1909 through 1912). Labor supply in 1930 is allowed to be affected by the change between the failure rate in 1929 and the average failure rate in 1910 (as above).[13] By construction, there is no change in the business failure rate in 1910. We allow this measure to have a differential effect on work in 1940 and in 1930 (relative to 1910). This variable is assigned by the individual's state of birth unless otherwise specified. X_{it} is a vector of person-specific characteristics such as her age (dummies) and marital status. $f_{s,s'}$ are fixed effects for the state of residence (s') and birth (s) to account for migration. g_t are year fixed effects to control for shocks over time that affect

[11] In the 1910-1930-1940 samples, as well as in the 1940-1950-1960 analysis, the dependent variable is constructed using the IPUMS variable "empstat" (y_{its} = 1 if "empstat"=1 and 0 otherwise). This variable does not exist in the 1920 Census and is fairly comparable across these years.

[12] These are failures in year *t-1*: in 1909 for 1910, in 1929 for 1930, and in 1939 for 1940. Throughout the analysis contemporaneous economic conditions are measured at the respondent's current state of residence *s'*, while past failures pertaining to the Great Depression are measured at the respondent's state of birth *s* unless otherwise specified. In equation (1) all remaining state variables are matched by the individual's state of birth *s*.

[13] The 1930 Census day was on April 1st, just 6 months after the October 1929 Wall Street Crash. The business failure rate is instead measured in December of each year. For this reason, we allow the 1929 (instead of 1930) failure rate to affect the 1930 labor supply.

uniformly all states. $z_{s,t}$ are division-year interactions (defined on the basis of the individual's state of birth) to account for omitted time-varying regressors that could confound the estimated impact of the Great Depression. Finally, $h_{s,1910}$ is a vector of 1910 state (of birth) characteristics (employment share in manufacture, share farmers, share nonwhite, share non-natives, average occupational score as a proxy for income) interacted with year dummies. Standard errors are clustered by birth state.

The results are presented in Table 2. As can be seen, in states with worse economic conditions during the Great Depression, women 20 to 64 years old work more in 1940 relative to previous decades (Panel A). This effect is primarily driven by women 20 to 44 years old in 1940. The increase in female labor supply upon the shock is consistent with the hypothesis of an *Added Worker Effect* whereby secondary earners enter the labor market to make up for losses in family income and/or assets. Notice that women 15 to 19 years old in 1940, who were just children at the onset of the Crash, do not modify their labor supply. Moreover, there is overall no statistically significant effect on the labor supply of women in 1930 (perhaps with the exception of 20 to 24 year olds), which could be due to the timing the employment status is measured in the 1930 Census (April 1st).

The impact of business failures on women's work is also quantitatively important. For instance, evaluating the coefficient of 0.034 for the 25 to 34 year olds at the average change in the business failure rate from peak to trough (about 0.79), the implied increase in the work share is 2.7 percentage points. This corresponds to an increase in employment by approximately 13% relative to the average age-specific employment rate in 1910 (0.21).

In Panels B and C, we study the robustness of the results in Panel A along two dimensions. First, we re-estimate (1) matching all state variables (including *GD*) at the individual's state of residence (Panel B). As there was a lot of migration in the 1930s, it is possible that the Great-Depression effects estimated above, using the respondent's state of birth as reference, are attenuated especially for relatively older women. Our revised estimates are indeed somewhat larger in magnitude but again they suggest effects for the exact same age-groups. Second, in Panel C we examine the role of the New Deal relief programs. The latter were instituted in the early 1930s (FERA, CWA, WPA and Social Security Programs) to provide work relief or direct relief to the poorer segments of the

Table 2: The short-term impact of the Great Depression on female labor supply

Dependent variable:	= 1, if currently employed						
Samples:	***I. 1910-1930-1940 pooled cross-sections (IPUMS)***						
Age in year *t*:	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 64	*20 to 64*
				A. Baseline			
frate_GD*d1930	-0.009	0.019	0.005	-0.006	-0.003	0.013	0.004
	(0.021)	(0.011)*	(0.010)	(0.012)	(0.012)	(0.017)	(0.006)
frate_GD*d1940	-0.010	0.034	0.034	0.017	-0.013	0.016	0.021
	(0.038)	(0.017)*	(0.016)**	(0.008)*	(0.014)	(0.022)	(0.009)**
N	98567	*95641*	*162771*	*125468*	*89330*	*57605*	*530815*
				B. Baseline-Assignment by state of residence			
frate_GD*d1930	-0.006	0.038	0.022	-0.012	-0.011	0.011	0.014
	(0.030)	(0.015)**	(0.017)	(0.016)	(0.026)	(0.019)	(0.010)
frate_GD*d1940	-0.013	0.036	0.041	0.021	-0.011	0.027	0.028
	(0.049)	(0.018)**	(0.018)**	(0.012)*	(0.023)	(0.017)	(0.011)**
N	98589	*95672*	*162822*	*125496*	*89344*	*57611*	*530945*
				C. Baseline-Account for New Deal relief			
frate_GD*d1930	-0.005	0.015	0.003	-0.014	0.007	0.003	0.000
	(0.022)	(0.011)	(0.010)	(0.011)	(0.012)	(0.015)	(0.005)
frate_GD*d1940	-0.004	0.059	0.054	0.033	-0.013	0.001	0.035
	(0.042)	(0.013)***	(0.014)***	(0.009)***	(0.013)	(0.017)	(0.007)***
N	96176	*93124*	*158422*	*122529*	*87268*	*56406*	*517749*

Samples:	***II. 1930-1940 pooled samples, data on bank & deposits suspended (county data)***			
Age in year *t*:	15 to 24	25 to 44	45 to 64	*20 to 64*
(i) share of 1926 total bank depos. suspended btw 1926 and 1929 *d1940	-0.000 (0.019)	0.039 (0.015)***	0.041 (0.014)***	0.035 (0.012)***
(ii) share of 1926 banks suspended btw 1926 and 1929 *d1940	0.008 (0.021)	0.059 (0.019)***	0.026 (0.016)	0.046 (0.016)***
N	*147425*	*224454*	*117534*	*414763*

Notes: (I) IPUMS: OLS coefficients from a regression of an indicator for whether the respondent is currently employed on the business failure rate increase during the Great Depression, contemporaneous failures, dummies for age and marital status, state of birth/residence and year fixed effects, division-year interactions, 1910 state covariates (employment share in manufacture, share farmers, share nonwhite, share non-natives, average occupational score). The business failure rate increase during the Great Depression is defined as the difference in the average business business failure rate between 1929/1932 and 1909/1912 for *t=1940* , as the difference in the business failure rate between 1929 and 1909/1912 for *t=1930* , and 0 if *t=1910* . Also see Section III, A. *(II) County data* : OLS coefficients from a regression of an indicator for whether the respondent is currently employed on the county change in deposits suspended between 1929 and 1926 relative to 1926 total deposits (specif. i) and on the county change in the number of banks suspendend between 1929 and 1926 relative to total number of banks (specif. ii). Other covariates: age, marital status, log-deposits in 1926, the number of banks in 1926, whether the state had branching regulation in 1929, whether the state has deposit insurance regulation in the 1920s, county covariates measured in 1920 (employment share in manufacture, share farms, share non-natives, share nonwhite, share literate, average occupational score), state of residence and county of residence fixed effects, state current failure rate, year fixed effects. Banking data come from the FDIC Data on Banks in the United States, 1920-1936 accessed through ICPSR. The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted with the available sampling weights. Standard errors are clustered by state (I) and county (II) respectively. ***, **, * indicate significance at 1%, 5% and 10% respectively.

population.[14] The presence of such relief programs, more so in areas more severely affected by the Depression, could have indirectly affected female labor supply.

[14] Theoretically, we would expect that the New Deal programs affected female work propensity mostly in a negative way such as by improving work prospects of men in the household or by increasing fertility rates (see Fishback et al., 2007). Hence, our baseline estimates in Panel A should be attenuated in the absence of controls for the New Deal spending.

Accounting for the extent of such help across states entails an increase in our benchmark estimates in Panel A.

Finally, in the last panel, we use county data on the 1926 share of banks and bank deposits that were suspended between 1926 (pre-Crash) and 1929 (post-Crash) as alternative measures of economic/financial distress. We study the relative impact of these proxies on the labor supply between 1930 and 1940.[15] These results point to the same conclusions as above and show the robustness of our main findings to a finer-than-the-state level of observation.

B. Female Labor Supply and the Great Depression: Long-Term Effects

In this section we pool data from the 1910, 1930, 1940 and 1960 censuses to examine the long-term effects of the Great Depression on female labor supply. First, we present what we consider as our baseline specification where we pool the 1940 and 1960 cross-sections. Subsequently we present the results from using the 1910, 1930, 1940 and 1960 cross-sections to account for pre-trends. The 1940-1960 sample is our benchmark for three main reasons. First, from 1940 onwards the definition of work and the underlying population are more comparable than before 1940. Second, from 1940 onwards, it is possible to also study the intensive work margin as information on *weeks worked in the past year* and *hours worked in the previous week* are reported. Third, from 1940 onwards, information on individual wages becomes available which allows us to study both labor market outcomes (wages and employment) in the same time frame and discuss the nature of labor supply shifts.

For the benchmark estimates that use the 1940-1960 pooled sample, we estimate the following specification:

[15] More precisely, our measures are: (i) the change in bank deposit suspensions between 1929 and 1926 divided by the total deposits in 1926, and (ii) the change in the number of banks suspended between 1929 and 1926 divided by the total number of banks in 1926. These measures are multiplied with a dummy for the year 1940. For this specification, banking data are matched by the individual's current county of residence as county at birth is not reported. These specifications also includes controls for the log-deposits in 1926, the number of banks in 1926, whether the state had branching regulation in 1929, whether the state has deposit insurance regulation in the 1920s, county covariates measured in 1920 (employment share in manufacture, share farms, share non-natives, share nonwhite, share literate, average occupational score), state of residence and county of residence fixed effects, state current failure rate, year fixed effects, age and marital status dummies. The data on bank branching and deposit insurance regulations come from Dehejia and Lleras-Muney (2007). Note that to avoid the problem of small cell-sizes, we aggregate age groups in larger age brackets.

$$y_{it,A} = \alpha_0 + \alpha_1 CC_{s',t} + \alpha_2 CC_{s',t} \cdot d_{1960} + \alpha_3 frate\_GD_{s,t} \cdot d_{1960} + \alpha_4 mobrate_s \cdot d_{1960} + \varphi_{ia} + f_{s,s'} + g_t + V_{s,1940} \cdot d_{1960} + z_{s,t} + \varepsilon_{it} \quad (2)$$

y_{its} is an indicator for whether woman i in age group A born in state s is employed at time t. Following Acemoglu et al. (2004), we measure the labor supply effects of WWII using the share of registered men 18-44 years old who were drafted or enlisted in the war in a given state (*Mobrate*) and control for the 1940 state share of men who were farmers, non-white, and for the average male education in 1940 (vector $V_{s,1940}$). Vector φ_{ia} includes individual age dummies. Time-invariant state-specific characteristics that could lead to differences across states in work via alternative channels than the one we propose are captured by state fixed effects which are included in all regressions. As before, we also include time-varying division (defined on the basis of birth-state) dummies to capture time-varying unobserved division changes ($z_{s,t}$). $f_{s,s'}$ and g_t are state of residence (s'), state of birth (s) and year fixed effects. All state covariates are matched by the individual's birth state except for contemporaneous failures. Standard errors are clustered by birth-state.

To control for changes in current economic conditions we include $CC_{ts'}$ and its interaction with a dummy for year 1960.[16] To capture the impact of the Great Depression on labor supply, we use the difference between the average business failure rate during the early years of the Crash (1929 through 1932) and the average failure rate in 1910 (base year, average of 1909 through 1912). We multiply the latter with a dummy for the year 1960 to make it time-varying. Hence, the coefficient α_3 should capture the *relative* effect of the Great Depression (as measured by the change in the failure rate) on the change in labor supply in a given age group between 1940 and 1960.

The results are reported in the first part of Table 3. We report the estimates for different age groups so that we can see the differential impact of the Great Depression on the work behavior of different cohorts. Women 35 to 64 years old in 1960 were of working age in 1940 (15 to 44 at the time), and correspond to the cohorts whose labor supply behavior we examined in the short-run analysis of Table 2. The long-run estimates suggest that the same cohorts that entered the market soon after the shock, also continued working significantly more in 1960 in states more severely impacted by the Great

[16] As in the short-term analysis, for contemporary failures (*CC*) we use the failure rate in year *t-1*: 1939 if *t=1940* and 1959 if *t=1960*.

Table 3: The longterm effect of the Great Depression on female labor supply

Age in year *t*:	15 to 34	35 to 44	45 to 59	45 to 64	40 to 64
			1940-1960 pooled samples		
Dependent variable:			*= 1, if currently employed*		
mobrate*d1960	0.148	0.196	-0.103	-0.184	-0.088
	(0.09)*	(0.134)	(0.205)	(0.191)	(0.169)
CC	0.043	-0.033	-0.086	-0.079	-0.072
	(0.019)**	(0.017)*	(0.034)***	(0.028)***	(0.022)***
CC*d1960	-0.044	-0.005	0.025	0.022	0.017
	(0.015)***	(0.013)	(0.019)	(0.016)	(0.013)
frate_GD*d1960	-0.029	-0.013	0.027	0.025	0.019
	(0.011)**	(0.009)	(0.007)***	(0.007)***	(0.007)***
N	*326161*	*147837*	*160327*	*196965*	*267404*
Dependent variable:			*weeks worked in the last year*		
frate_GD*d1960	-0.723	-0.371	1.409	1.186	0.982
	(0.638)	(0.412)	(0.323)***	(0.342)***	(0.328)***
Dependent variable:			*hours worked last week*		
frate_GD*d1960	-0.841	-0.223	0.838	0.799	0.746
	(0.539)	(0.381)	(0.248)***	(0.255)***	(0.254)***
N	*326161*	*147837*	*160327*	*196965*	*267404*
Dependent variable:			*= 1, if currently employed*		
	1910-1930-1940-1960 pooled samples-			*assignment by birth state*	
frate_GD*d1930	0.010	0.001	0.006	0.005	0.006
	(0.009)	(0.013)	(0.011)	(0.010)	(0.010)
frate_GD*d1940	0.023	0.02	0.000	-0.003	-0.009
	(0.018)	(0.009)**	(0.013)	(0.011)	(0.009)
frate_GD*d1960	-0.015	-0.002	0.031	0.027	0.015
	(0.011)	(0.012)	(0.016)**	(0.013)**	(0.011)
N	*529471*	*217900*	*225340*	*275500*	*377295*
	1910-1930-1940-1960 pooled samples-			*assignment by current state*	
frate_GD*d1930	0.031	0.023	0.019	0.016	0.017
	(0.014)**	(0.018)	(0.022)	(0.018)	(0.015)
frate_GD*d1940	0.036	0.047	0.012	0.015	0.019
	(0.019)*	(0.013)***	(0.019)	(0.016)	(0.013)
frate_GD*d1960	-0.005	0.020	0.040	0.038	0.032
	(0.012)	(0.013)	(0.022)*	(0.018)**	(0.015)**
N	*530031*	*218037*	*225255*	*275360*	*377212*

Notes: OLS coefficients from regressions of the dependent variables stated above on the business failure rate increase during the Great Depression (interacted with year dummies), contemporaneous failures, dummies for age and marital status, state of birth/residence and year fixed effects, division-year interactions, WWII mobilization rate, 1940 state covariates (for estimates using 1940-1960 pooled samples: share of men who were farmers, share of non-whites, average male education - also see Section III. B & eq. 2), 1910 state covariates (for estimates using 1910-1930-1940-1960 pooled samples, see notes to Table 2, I and Section III.B & eq. 3). The business failure rate increase during the Great Depression is defined as the difference in the average business failure rate between 1929/1932 and 1909/1912 for t>=1940, as the difference in the business failure rate between 1929 and 1909/1912 for t=1930, and 0 if t=1910. All state variables are assigned on the basis of the respondent's state of birth unless otherwise stated (see last section of the table above). The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted using the available sampling weights. Where assignment of state variables is by birth (current) state, standard errors are clustered by state of birth (residence) too. ***, **, * indicate significance at 1%, 5% and 10% respectively.

Depression. These women are 40 years old in 1960 or older.[17] Instead, women younger than age 40 in 1960, who were either children or unborn at the time of the Crash, do not significantly increase their labor supply. Quantitatively, evaluated at the average increase in the business failure rate between peak and trough (about 0.79), the coefficient estimate of 0.025 for the 45 to 64 age bracket, suggests an increase in the relative labor supply of this age group in 1960 by approximately 2 percentage points, which amounts to a roughly 10% increase from the work share of 45 to 64 year olds in 1940 (0.20).

In line with the hypothesis that the entry/re-entry of this cohort of women into the labor market is also driven by a labor demand shift, we find that work shares increase in response to improvements in contemporaneous economic conditions. The estimates do not support the hypothesis that WWII mobilization led to higher labor market participation for this group of women (see also Goldin, 1991) in the long-run.

Using weeks and hours worked as outcome variables (intensive margin) we find patterns strongly significant and very similar to the baseline extensive margin. Quantitatively, evaluated at the average increase in the business failure rate between peak and trough (about 0.79), the estimate of 1.186 (0.799) for the 45 to 64 age bracket, suggests an increase in the relative weeks worked (hours worked) of this age group in 1960 by 0.94 (0.63), which amounts to a roughly 10% (9%) increase from the weeks worked (hours worked) of 45 to 64 year olds in 1940 (9.31 weeks and 7.31 hours respectively).

Specification (2) does not incorporate any information on pre-Depression labor supply trends and does not fully reveal the "dynamic" effect of the shock over time.[18] To address this, we also pool the 1910-1930-1940 and 1960 cross-sections and estimate regressions of the same general form as in (1):

$$y_{it,A} = \alpha_0 + \alpha_1 CC_{s',t} + \alpha_2 CC_{s',t} \cdot d_{1930} + \alpha_3 frate\_GD_{s,t} \cdot d_{1960} + \alpha_4 frate\_GD_{s,t} \cdot d_{1940} + \alpha_5 frate\_GD_{s,t} \cdot d_{1930} + \alpha_6 mobrate_s \cdot d_{1960} + \alpha_7 X_{it} + f_{s,s'} + g_t + z_{s,t} + h_{s,1910} \cdot d_t + \varepsilon_{it} \qquad (3)$$

The only difference between specifications (1) and (3) is that the latter accounts for the effect of WWII mobilization and allows the Great Depression to have a differential effect

[17] These results persist when we match state variables by the individual's current state of residence. Results are available upon request.

[18] The results, however, persist when we control for age-specific average work shares in years preceding 1940 (results available upon request).

in 1930, in 1940 and in 1960. All variables are as previously defined.[19]

The results from (3) are presented in the second part of Table 3. Because immigration increased significantly between 1940 and 1960 (Molloy et al.; 2011), we also present estimates when all state covariates are matched on the basis of the state of residence.[20] The results from this extended sample corroborate the findings obtained from the shorter 1940-1960 pooled sample. There are several conclusions that emerge. First, the issue of cross-state migration is relevant and therefore estimates based on state of residence assignment are stronger in terms of significance and larger in magnitude. Indicatively, evaluated at the average increase in the business failure rate between peak and trough (about 0.79), the estimate of 0.038 for the 45 to 64 age bracket, suggests an increase in the labor supply of this age group in 1960 by approximately 3 percentage points, which amounts to a roughly 15% increase from the work share of 45 to 64 year olds in 1940 (0.20) and to a 20% increase from the work share of this age group in 1910 (0.14).

Second, these results (and particularly when assignment is done by the state of residence) highlight the *cohort-specific* pattern of our findings: it is women 44 years old and younger in 1940 that primarily increase their work shares in the short-run in response to the shock (as also shown in Table 2), and it is exactly the same cohort of women that works more in 1960.

C. Wages and the Great Depression: Long-Term Effects

Next, we explore the link between past conditions and contemporaneous wages. If, as we argue, the Great Depression led to a labor supply shift after 1940, we should observe that the same shock decreases real wages over the same period. Panel I in Table 4 reports results from the estimation of specification (2) for the 1940-1960 pooled sample, where the dependent variable is the log of real weekly wages. The negative and significant estimate associated with the increased business failures rate of the early 1930s is consistent with the hypothesis that the Great Depression led to an outward shift in the labor supply of women in the *D-cohort*.

To correct for possible self-selection bias, we re-estimate specification (2), with real

[19] Failures during the Great Depression (*GD*) is defined as follows: for 1960 and 1940 we take the difference between average failures in 1929/1932 and average failures in 1909/1912; for 1930, we take the difference between failures in 1929 and average failures in 1909/1912; the variable takes value 0 in 1910.

[20] When we match state variables by state of residence, division-year interactions and clustering are accordingly modified.

Table 4: The long-term impact of the Great Depression on female wages (1940-1960)

Age in year *t*:	35 to 44	45 to 59	45 to 64	40 to 64
Dependent variable:		log-real weekly wage		
Panel I:		***OLS estimates***		
frate_GD*d1960	-0.031	-0.059	-0.081	-0.037
	(0.027)	(0.033)*	(0.032)**	(0.036)
N	*42309*	*32978*	*38107*	*52568*
Panel II:		***Heckman corrected estimates***		
frate_GD*d1960	-0.011	-0.092	-0.114	-0.062
	(0.029)	(0.042)**	(0.047)***	(0.042)
Inverse mills ratio	-0.889	-0.921	-0.959	-0.869
	(0.027)***	(0.026)***	(0.023)***	(0.017)***
N	*144067*	*154852*	*190421*	*258850*

Notes:Panel I - OLS coefficients from a regression of log real weekly wages on the business failure rate increase during the Great Depression (interacted with a year dummy), contemporaneous failures, dummies for age, marital status, education, state of birth/residence and year fixed effects, division-year interactions, WWII mobilization rate, 1940 state covariates (share of men who were farmers, share of non-whites, average male education - also see Section III. B & eq. 2). The business failure rate increase during the Great Depression is defined as the difference in the average business failure rate between 1929/1932 and 1909/1912. *Panel II* - Heckman corrected estimates of model in *Panel I*. Exclusion restriction is the number of own family members residing with each individual, including the person her/himself (IPUMS variable *famsize*). All state variables are matched by the respondent's state of birth. The sample includes white women in non-farm households, born in the United States and not in group quarters, who worked more than 47 weeks in the previous year. All estimates are weighted using the available sampling weights. Standard errors are clustered by birth state. ***, **, * indicate significance at 1%, 5% and 10% respectively.

wages as the dependent variable, using a Heckman two-step procedure. Selection would occur if, for instance, the Great Depression drew in the labor market women with "worse" unobservable characteristics, possibly employed in lower-skill, more brawn-type occupations. In response, women with "better" unobservable characteristics would drop out of the workforce. In this case, the negative effects on wages could be due to a compositional change of the work-force. The Heckman-corrected estimates are presented in Panel II of Table 4. The exclusion restriction is the number of own family members residing with each individual, including the person her/himself (IPUMS variable *famsize*). These "corrected" estimates confirm that the negative effect of past conditions on current wages is not due to selection. Although there has been negative selection in the workforce across *all* women in the *D-cohort,* this selection *neither* significantly alters our previous

findings of a persistent wage decline linked to the Great Depression nor contradicts our interpretation of a labor supply shift. In fact, the adjusted estimates suggest an even stronger effect of the Depression in lowering contemporaneous wages.

IV. Robustness and Identification of Long-term Effects

Our analysis of the long-term impact of the Great Depression on female employment suggests that these effects are quantitatively important and that they do not appear to be driven by pre-trends in female employment that are systematically correlated with our measure of economic distress. In this section, we perform several robustness exercises.

First, we consider various alternative measures of the Great Depression. All of them consistently lead to the same conclusions. Second, we examine the work behavior of the same cohort using the 1910-1930-1940-1950 and 1940-1950 pooled samples. For this exercise, we also use the bank suspension data at the SEA-level. This allows us to examine the robustness of our findings with an alternative measure and with more variation than across states (there are around 500 SEAs). We consistently find the exact same patterns. Third, we explicitly examine the potential role of alternative hypotheses that have been brought as explanations of the dramatic increase in the labor force participation of older women in the 1950s: 1) the expansion of the white collar sector in the early 20th century (Goldin, 1998a); 2) the diffusion of home technology in the early 1900th (Greenwood et al., 2005); 3) the increased education of women in the early part of the century (Goldin, 1990, see Section II on the related literature). These changes could have been more important in states where the Great Depression was more severe and be the true driving force behind our results. Fourth, we consider an instrumental variables strategy that uses the 1900 state-specific size of the durables and non-durables sectors weighted by their national growth between 1910 and 1930 as an instrument for the state business failure rate in the 1930s. Fifth, we perform a falsification exercise checking whether our baseline measure of the Great Depression can predict labor force participation of women in pre-Depression decades. We find that none of these exercises changes our baseline results. Finally, we provide external validity to our findings using a 1978 survey of women in the *D-cohort.*

We conclude that, while we cannot completely rule out the potential presence of omitted factors, the facts that our results are robust 1) across samples over time, 2) to the use of different measures of the Great Depression, 3) to the potential presence of pre-

existing trends and to alternative existing explanations, are jointly suggestive of a causal link between the Great Depression and the work of women in the *D-cohort*.

A. Alternative state measures of the Great Depression

First, we employ data from Fishback on state real per capita personal income. We use the change in log-per capita real income between 1929 and 1932 to capture the decline in incomes induced by the Great Depression. Second, we use data from the *Census of Manufactures* in order to construct alternative state measures of economic distress and of the decline in employment opportunities during the Great Depression. These are used in our baseline specification (equation 2) - in lieu of the change in the business failure rate - to predict relative female work patterns between 1940 and 1960. The following variables are used: log real wage per wage earner, and the number of establishments in the manufacturing sector.[21] To capture the deteriorating economic environment during the

Table 5: The longterm effect of the Great Depression on female labor supply
Alternative measures of the Great Depression shock (1940-1960)

Ages in year *t*:	35 to 44	45 to 59	40 to 64	45 to 64
Dependent variable:		*=1, if currently employed*		
(1) [Change in log(real per cap. income): 1932-1929 (*decline)*]*d1960	-0.061 (0.033)*	-0.085 (0.035)**	-0.067 (0.028)**	-0.06 (0.035)*
(2) [Change in log(real per worker manuf. wage): 1933-1929 (*decline)*]*d1960	-0.007 (0.016)	-0.058 (0.014)***	-0.049 (0.012)***	-0.065 (0.011)***
(3) [Change in number of manuf. establishments: 1933-1929 (*decline)*]*d1960	-0.002 (0.001)	-0.004 (0.001)***	-0.004 (0.001)***	-0.003 (0.001)***
N	*147837*	*160327*	*267404*	*196965*

Notes: OLS coefficients from regressions of an indicator for whether the respondent is currently employed on alternative state measures of economic distress during the Great Depression, contemporaneous business failure rate, WWII mobilization rate, 1940 state covariates (see notes to Table 2), age and marital status dummies, state of residence/birth and year fixed effects and division-year interactions. Data on state income come from Fishback and on manufacturing (wages, number of workers, number of establishments) from the Census of Manufactures. All state variables are matched by the respondent's state of birth. The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted by the available sampling weights. Standard errors are clustered by birth state. ***, **, * indicate significance at 1%, 5% and 10% respectively.

core Depression years, we use the change (decline) in these variables between 1929 and 1933. While our baseline measure summarizes the decline in activity of a broader

[21] Wages are deflated by the same year CPI index.

spectrum of sectors, these measures are more focused. Nonetheless, the manufacturing sector represents a large part of the economy and its size varies significantly across states. The change in the number of establishments is the measure that most closely resembles the business failure measure, though it is more general. It summarizes a decline that can be due to failures or to the closing down of a business before it fails or simply a decrease in the creation of new businesses.[22]

The results are reported in Table 5. As can be seen, the different measures are associated with a relative employment increase in 1960 for the cohort of interest: women 40 to 64 years old in 1960. Furthermore, measuring the extent of the Great Depression in terms of income losses produces effects that are also quantitatively important. Considering the log-income measure, the latter dropped by 0.36 between 1929 and 1932. This entailed an increase in work shares of the 40 to 64 years old women in 1960 by roughly 12% relative to the respective age-specific shares in 1940. The effects are quantitatively larger for women 45 to 59 years old.

B. 1940-1950 pooled sample

We employ the 1940-1950 and the 1910-1930-1940-1950 pooled samples to test whether our main results of the long-term impact of the Great Depression on the labor supply of the *D-cohort* still go through. These women are 35 to 54 years old in 1950, and their employment response to the Crash is compared to that of women 35 to 54 years old in previous decades. First, we re-estimate specification (2), using the same controls as in the 1940-1960 analysis. In this case, we compare the employment response (work shares, weeks and hours worked) of women in various age brackets in 1950 relative to 1940. The results are presented in Table 6 and suggest an increase in the labor supply of a subset of women in the *D-cohort*, women 45 to 54 years old in 1950. Subsequently, as in the baseline case, we re-estimate specification (3) on the extended 1910-1930-1940-1950 sample using the assignment of the state variables by state of birth and current state of residence. The conclusions are very similar to the baseline. Estimates by the current state of residence suggest long-term labor supply effects for the older group of women in the *D-*

[22] In all the cases presented here, the measure is a vector with the change in the log of income, or of average wages or in the number of establishments between 1933 (1932 in case of income) and 1929 in 1960 and 0 in 1940. We examine how much female work shares increased in 1960 relatively to 1940, which was also affected. A decline indicates a worsening of economic conditions between 1932 or 1933 and 1929.

Table 6: The impact of the Great Depression of female labor supply
Robustness: Alternative Samples & Time Periods (1940-1950)

Age in year *t*:	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64
		1940-1950 pooled samples			
Dependent variable:		*= 1, if currently employed*			
Panel I:					
frate_GD*d1950	-0.009	-0.008	-0.007	0.031	-0.003
	(0.013)	(0.007)	(0.007)	(0.011)***	(0.008)
N	*180089*	*180392*	*145285*	*95416*	*61280*
Panel II:					
Dependent variable:		*weeks worked last year*			
frate_GD*d1950	0.411	0.156	0.400	1.372	0.776
	(0.977)	(0.442)	(0.607)	(0.533)**	(0.548)
N	*105213*	*99900*	*78316*	*58290*	*39403*
Panel III:					
Dependent variable:		*hours worked last year*			
frate_GD*d1950	-0.356	-0.064	0.078	1.278	-0.170
	(0.578)	(0.307)	(0.289)	(0.400)***	(0.371)
N	*180089*	*180392*	*145285*	*95416*	*61280*
Panel IV:	***1910-1930-1940-1950 pooled samples*** - assignment by birth state				
Dependent variable:		*= 1, if currently employed*			
frate_GD*d1930	0.003	0.006	-0.003	0.003	0.021
	(0.012)	(0.010)	(0.012)	(0.012)	(0.019)
frate_GD*d1940	0.009	0.036	0.022	-0.012	0.019
	(0.025)	(0.016)**	(0.009)**	(0.014)	(0.023)
frate_GD*d1950	-0.014	0.018	0.010	0.021	0.021
	(0.018)	(0.015)	(0.011)	(0.017)	(0.025)
N	*292865*	*270926*	*215348*	*143439*	*91792*
Panel V:	***1910-1930-1940-1950 pooled samples*** - assignment by current state				
Dependent variable:		*= 1, if currently employed*			
frate_GD*d1930	0,014	0.021	0.009	0.027	0.020
	(0.013)	(0.016)	(0.016)	(0.022)	(0.017)
frate_GD*d1940	0.007	0.042	0.034	0.012	0.034
	(0.028)	(0.018)**	(0.012)***	(0.022)	(0.014)**
frate_GD*d1950	-0.021	0.019	0.015	0.046	0.058
	(0.019)	(0.017)	(0.013)	(0.023)**	(0.017)***
N	*292936*	*270846*	*215200*	*143285*	*91667*

Notes: See notes to Table 3.

Table 7: The impact of the Great Depression of female labor supply
Robustness: Alternative samples & measures (Banking data by SEA: 1930-1940-1950)

Age in year *t:*	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	*35 to 64*
Dependent variable:			*= 1, if currently employed*			
Panel I:						
[share of 1926 total bank depos. suspended btw 1926 and 1929] *d1940	-0.059 (0.068)	0.009 (0.066)	0.118 (0.076)	0.103 (0.059)*	0.010 (0.029)	0.087 (0.031)***
[share of 1926 total bank depos. suspended btw 1926 and 1929] *d1950	-0.165 (0.064)***	-0.090 (0.044)**	0.091 (0.101)	0.106 (0.047)**	0.152 (0.039)***	0.083 (0.038)**
Panel II:						
[share of 1926 banks suspended btw 1926 and 1929]*d1940	-0.084 (0.071)	-0.099 (0.069)	0.178 (0.097)*	0.292 (0.076)***	-0.053 (0.142)	0.116 (0.050)**
[share of 1926 banks suspended btw 1926 and 1929]*d1950	-0.187 (0.079)**	-0.163 (0.056)***	0.090 (0.129)	0.166 (0.081)**	0.066 (0.146)	0.057 (0.058)
N	*202272*	*188822*	*141348*	*75502*	*37963*	*368723*

Notes: OLS coefficients from a regression of an indicator for whether the respondent is currently employed on the SEA change in bank deposits suspended between 1929 and 1926 relative to 1926 total deposits (*Panel I*) and on the SEA change in the number of banks suspendend between 1929 and 1926 relative to total number of banks (*Panel II*). Both measures of banking distress are interacted with year dummies. Other covariates: age, marital status, log-deposits in 1926, the number of banks in 1926, whether the state had branching regulation in 1929, whether the state has deposit insurance regulation in the 1920s, SEA covariates measured in the 1920s, SEA covariates measured in 1920 (see notes to Table 2), SEA and year fixed effects, contemporaneous unemployment rate in the SEA of residence. Banking data come from the FDIC Data on Banks in the United States, 1920-1936 accessed through ICPSR. The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted with the available sampling weights. Standard errors are clustered by SEA. ***, **, * indicate significance at 1%, 5% and 10% respectively.

cohort – 45 to 54 years old in 1950 – but also for the slightly older women aged 55 and above in 1950. We observe no effects among women who were children or unborn at the onset of the Crash (group of 15 to 34 year olds).

Finally, in Table 7, we pool the 1930, 1940 and 1950 cross-sections and we present estimates of the long-term impact of banking collapse on female work shares, essentially extending the short-term analysis of Table 2. We use the same indicators of financial distress as in Table 2 – change in share of deposits and banks suspended between 1926 and 1929 relative to 1926 total deposits and number of banks respectively – but computed at the SEA level as no county information is available.[23] As with the state-level business

[23] These indicators are matched to the IPUMS data files by the respondent's SEA of current residence as SEA of birth is not reported. Both measures are interacted with dummies for years 1940 and 1950. The

failure measure, these indicators – and in particular the one accounting for deposits suspended – also suggest positive and significant long term effects on the work shares of the *D-cohort* of women, 35 years old in 1950 and older. These results corrobate our conclusion that the Great Depression had a lasting, positive impact on the labor supply of women who were old enough to experience it and that this impact was cohort-specific.

C. Identification: existing explanations and confounding factors

As previously discussed, the long-term impact of economic conditions surrounding the Great Depression could be confounded by three factors that also changed in the early 20th century, and which have been linked to the increased employment of older women (see Section II): the expansion of the white-collar sector, the diffusion of home technology, and the increase in female educational attainment. In Table 8 we explicitly account for changes in these factors by controlling for individual education (Panel I) and for changes in the share of women employed in white-collar occupations in a given state between 1930 and 1910 (Panel II). To address the importance of the diffusion of home technology, we use the state electrical service exposure index constructed by Bailey and Collins (2011) from the Edison Electrical Institute's *Statistical Bulletin*. This is an annual index first computed in 1925. We use the change in exposure to electrification between 1925 and 1932 (interacted with a dummy for 1960) as our measure of home technology diffusion. These results are presented in Panel III. As can be seen, in all cases, the baseline effects remain intact.

To address further identification concerns, we construct a Bartik (1991)-type instrument for changes in past failures that uses changes in the national growth rate of manufacturing, along with the state share of this industry in 1900, a point in time that precedes the time frame of our analysis.[24] The main idea is that shocks in the national growth rate in manufacturing, usually driven by demand, should differentially affect local business activity depending on the initial concentration in manufacturing. In states where the manufacturing sector was larger, negative nationwide shocks such as that experienced during the Great Crash, should entail bigger increases in business failure rates, especially

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regression further control for contemporaneous unemployment rate in the SEA of residence, age, marital status, year and SEA fixed effects, log-deposits in 1926, the number of banks in 1926, whether the state had branching regulation in 1929, whether the state has deposit insurance regulation in the 1920s, SEA covariates measured in 1920 (employment share in manufacture, share farms, share non-natives, share nonwhite, average occupational score).

[24] Also see Schaller (2016) for a similar application.

since the latter heavily reflect business activity in manufacturing (see Section II on Data and Descriptive Statistics). As also shown in Table 1, states with higher concentration in manufacturing in 1920 experienced higher failure rates in 1930, while the size of the agricultural sector had no significant effect. To increase the variability of the instrument, we decompose the manufacturing sector into durables and non-durables. In particular, the instrument is computed as follows:

$$I_{s,1930-1910} = g_{d,1930-1910} * Emp.share^{d}_{1900,s} + g_{nd,1930-1910} * Emp.share^{nd}_{1900,s}$$

$g_{i,1930-1910}$ (i=*d, nd*) is the national employment growth rate in the durables and non-durables sectors respectively between 1930 and 1910 weighted by the size of these sectors in 1900, as measured by their state employment shares. To instrument the difference in the business failure rate used in equation (2), we multiply $I_{s,1930-1910}$ with a dummy for the year 1960 to make it time-varying. Finally, in the IV specification we further control for state-level actual changes between 1930 and 1910 in the size of employment in various industries.[25] The identification assumption is that, conditional on all covariates, the instrument is valid if the national growth rate in durables and nondurables is uncorrelated with state-level labor demand shocks.

The second stage estimates are presented in Panel IV of Table 8 along with the associated F-statistic.[26] The F-statistics do not indicate the presence of a weak instrument, while the second stage coefficients suggest effects that align with the OLS estimates although they are slightly larger in magnitude. Evaluated at the average increase in the business failure rate between peak and trough (about 0.79), the IV estimate of 0.041 for the 45 to 59 age bracket, implies an increase in the relative work share of this age group in 1960 by approximately 3.2 percentage points, which amounts to a roughly 15% increase from the work share of 45 to 59 year olds in 1940 (0.21).

Finally, in Panel V we present results from a falsification test where we pool the 1880 and 1900 (pre-Depression) cross-sections and estimate specification (2). The goal is to examine whether conditional on all covariates specified in (2) the change in the average business failure rate between 1929 to 1932 and 1909 to 1912, as in our previous estimations, can predict relative increases in labor force participation of older women in

[25] These are manufacturing, agriculture, mining, construction, trade, services, finance, telecommunications, transportation, utilities and public administration.
[26] As anticipated, the first stage estimate is always positive.

Table 8: The long-term impact of the Great Depression of female labor supply
Robustness: existing explanations and confounding factors

Ages in year *t:*	35 to 44	40 to 64	45 to 64	45 to 59
		1940-1960 pooled samples		
Dependent variable:		= 1, if currently employed		
Panel I:		***Controlling for individual educational attainment***		
frate_GD*d1960	-0.014	0.019	0.024	0.025
	(0.009)	(0.007)***	(0.007)***	(0.007)***
Panel II:		***Controlling for changes in white-collar female employment between 1910 and 1930***		
frate_GD*d1960	-0.015	0.018	0.026	0.027
	(0.008)*	(0.006)***	(0.007)***	(0.007)***
white collar	0.202	0.119	-0.017	0.024
	(0.121)*	(0.135)	(0.131)	(0.132)
Panel III:		***Controlling for exposure to electrification***		
frate_GD*d1960	-0.009	0.020	0.026	0.024
	(0.009)	(0.009)**	(0.009)***	(0.011)**
electr. index	0.000	0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
N	*147837*	*267404*	*196965*	*160327*
Panel IV:		***Instrumental variables***		
frate_GD*d1960	-0.000	0.023	0.024	0.041
	(0.015)	(0.012)*	(0.012)**	(0.014)***
F-stat	*14.11*	*14.35*	*14.32*	*14.24*
N	*143568*	*259591*	*191151*	*155576*
Panel V:		***Falsification exercise: 1880-1900***		
Dependent variable:		=1, if in the labor force		
frate_GD*d1900	0.021	0.014	0.024	0.026
	(0.013)	(0.016)	(0.014)	(0.017)
N	*26653*	*38600*	*26625*	*21987*

Notes: See notes to Table 3 for baseline covariates as well as Section IV.C. Specification in Panel I also includes dummies for the respondent's educational attainment. Specification in Panel II also controls for the change in the state's share of women employed in white-collar occupations between 1910 and 1930. These state shares were computed from the 1930 and 1910 IPUMS Censuses for women that were currently employed in 1930 and 1910 respectively. Specification in Panel III also controls for the change in exposure to electrification between 1925 and 1932. The electrical service exposure index was constructed by Bailey and Collins (2011) from the Edison Electrical Institute's Statistical Bulletin. Specification in Panel IV also controls for the change in state employment shares between 1910 and 1930 in the following industries: manufacturing, agriculture, mining, construction, trade, services, finance, telecommunications, transportation, utilities and public administration. See Section IV.C for details on the construction of the instrument. All state variables are matched by the respondent's state of birth. The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted using the available sampling weights. Standard errors are clustered by birth state. ***, **, * indicate significance at 1%, 5% and 10% respectively.

the pre-Depression decades. This would cast doubts on our interpretation of the exogeneity of our measure of the Great Depression. Reassuringly we find non-significant estimates across women in all age brackets.

Overall, while the possibility of endogeneity cannot be completely eliminated, the IV results along with the remaining analysis in Tables 3 and 5 through 8 strongly support the causal interpretation of the long-term estimates of the Great Depression.

D. Results from a Survey

A special survey on a subset of women in our cohort (see Ridley, 1978) provides an additional external validity check on the hypothesis that the Great Depression had a long-term impact on the *D-cohort*.[27] This survey covers ever married women born between 1901 and 1910, who are part of our focal cohort. In 1978, these women were asked questions pertinent to the Great Depression, along with the number of years they worked after their first marriage. Their average age at first marriage was 21.8. Among women who worked after first marriage, the average age at retirement was 56.6 years and the median 61 years. This is consistent with data from the Census that show considerable persistence in their participation in the labor market throughout several decades.

We examine the effect of the Great Depression on the number of years worked after their first marriage by using two questions of the survey: 1) '*Did the Depression influence you to find a job, either within or outside your home?*'. To this question 27.1% of the women answered affirmatively; 2) '*How much did you worry about your family's future during the Depression?*' To this question, 23.2% replied they were very worried, 18.6% moderately worried, 21.5% slightly worried and 35.7% not worried at all. The dependent variable in our regression is the number of years a woman worked after her first marriage. Of the 1049 women in the sample, 788 worked after marriage. The main regressors are: *GD-Find a Job*, which is an indicator variable with value of 1 if the Great Depression influenced them to find a job (question 1), 0 otherwise; *GD-worry_a* is an indicator that takes value 1 if they were very worried about their family future (question 2), and 0 otherwise while *GD-worry_b* takes value 1 if they were very or moderately worried about their family future, and 0 otherwise.

Table 9 reports the estimates using OLS and ordered probit models. All specifications

[27] The '*Low-Fertility Cohorts Study, 1978: A Survey of White, Ever-Married Women Belonging to the 1901-1910 United States Birth Cohorts*' (see Ridley,1978).

include age and state of birth dummies. As can be seen, factors dating back to the Great

Table 9: Results from the Low-Fertility Cohort Study, 1978

Dependent Variable: # years worked after first marriage		
	ols	*ordered probit*
Did the Depression influence you to find a job, either within or outside your home? (GD-Find a Job)		
GD-Find a Job	3.61	0.271
	(1.156)***	(0.086)***
N	*786*	*786*
How much did you worry about your family's future during the Depression? (very worried)		
GD-Worry_a	3.747	0.283
a lot (23.2%)	(1.249)***	(0.093)***
N	*786*	*786*
How much did you worry about your family's future during the Depression? (very or moderately worried)		
GD-Worry_b	2.078	0.149
a lot or moderately	(1.075)*	(0.080)*
(41.1%)		
N	*786*	*786*

Note: Data come from the survey *"Low-Fertility Cohorts Study, 1978: A Survey of White, Ever-Married Women Belonging to the 1901-1910 United States Birth Cohorts"* (ICPSR 4698). Age and state dummies are included. GD-Find a job, variable V1250=1, 0 otherwise. GD-Worry_a, variable V1252=2 (very worried). GD-Worry_b, variable V1252=2 or V1252==3 (very or moderately worried).

Depression, such as having to find a job or strong concerns about its impact on their families, significantly increased the number of years these women remained in the labor market after first marriage. As the level of worry women had during the Great Depression decreases, the level and significance of the associated estimates decreases as well (see the results for *GD-worry_b*).

These findings are reassuring because they are based on a totally different source and yet they are consistent with the hypothesis that women in the *D-cohort* stayed significantly longer in the labor market because of the hardships they likely experienced during the Great Depression.

VI. Occupations

While all the analysis thus far indicates that women who were of working age at the time of the Crash had their entire labor supply profile permanently altered by this dramatic shock, a relevant question is in which occupations they entered and remained. To answer this question, we pool the 1930, 1940 and 1960 cross-sections and estimate a multinomial logit model of the likelihood of participation in an occupation *k* relative to another baseline occupation *K*. This model treats presence in each occupation group as a

choice among multiple alternatives and takes into account the overall underlying occupational structure, which is likely varying over time. We consider being *out of the labor force* as a choice, and that is our reference category. The remaining five categories are: professional and managerial ("professional/managerial"), clerical, operatives and crafts ("operatives"), services and other. The latter is a residual category which includes sales, laborers and farmers.

Table 10: Impact of the Great Depression on female employment across occupations

			1930-1940-1960 pooled samples			
Options:	**Operatives/Crafts**	**Services**	**Profes./Manag.**	**Clerical**	**Other**	**Out of labor force**
Age in year *t*:			35 to 44 years old			
frate_GD*d1930	0.079	-0.014	-0.013	0.001	-0.027	-0.026
	(0.014)***	(0.013)	(0.011)	(0.017)	(0.010)***	(0.021)
frate_GD*d1940	0.085	-0.019	-0.014	0.003	-0.012	-0.043
	(0.017)***	(0.016)	(0.012)	(0.002)	(0.011)	(0.023)*
frate_GD*d1960	0.094	-0.017	-0.026	-0.003	-0.017	-0.030
	(0.017)***	(0.015)	(0.012)**	(0.022)	(0.011)	(0.024)
N			*188876*			
Age in year *t*:			45 to 64 years old			
frate_GD*d1930	0.047	-0.014	-0.018	0.032	-0.016	-0.030
	(0.013)***	(0.012)	(0.012)	(0.019)	(0.009)*	(0.024)
frate_GD*d1940	0.047	-0.015	-0.017	0.042	-0.017	-0.039
	(0.013)***	(0.015)	(0.013)	(0.021)**	(0.009)*	(0.026)
frate_GD*d1960	0.056	-0.009	-0.007	0.037	-0.013	-0.064
	(0.013)***	(0.014)	(0.012)	(0.023)	(0.009)	(0.029)**
N			*243468*			

Notes: Coefficients are average marginal effects from a multinomial logit model where the reference category is out of the labor force. See Table 3 for definition of the change in the business failure rate during the Great Depression. Other covariates: age, marital status dummies, state of birth/residence and year fixed effects, division-year interactions, WWII mobilization rate

All state variables are matched by the respondent's state of birth. The sample includes white women in non-farm households, born in the United States and not in group quarters. All estimates are weighted using the available sampling weights. Standard errors are clustered by birth state. ***, **, * indicate significance at 1%, 5% and 10% respectively.

The estimates are presented in Table 10. We compare the occupational outcomes of women 35 to 44 and 45 to 64 years old in 1960 to those of women in the same age brackets in 1940 and in 1930. All these cohorts experienced the Great Depression at different stages of their work cycle and hence their occupational presence could have been impacted by this shock. The results overwhelmingly suggest that the latter implied a systematic, permanent shift towards blue-collar, manufacturing jobs.

VII. Possible Channels

The results from the previous section suggest that existing explanations for the

increased participation of older women - such as changes in education, the expansion of

Table 11: Impact of the Great Depression on male labor supply

			1910-1930-1940 pooled samples				
Ages in year *t*:	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 64	*20 to 64*
Dependent variable			=1 if currently working				
frate_GD*d1930	0.001	-0.017	-0.011	-0.008	-0.001	-0.017	-0.009
	(0.021)	(0.020)	(0.013)	(0.012)	(0.012)	(0.018)	(0.007)
frate_GD*d1940	0.016	-0.005	-0.002	-0.016	-0.008	-0.046	-0.011
	(0.033)	(0.020)	(0.014)	(0.018)	(0.009)	(0.026)*	(0.011)
Dependent variable			=1 if in the labor force				
frate_GD*d1930	0.004	-0.019	-0.009	0.000	-0.005	-0.021	-0.010
	(0.022)	(0.015)	(0.003)***	(0.005)	(0.006)	(0.013)	(0.004)***
frate_GD*d1940	0.020	-0.020	-0.008	-0.005	-0.008	-0.044	-0.013
	(0.024)	(0.012)	(0.004)**	(0.005)	(0.007)	(0.017)***	(0.003)***
N	*92417*	*84933*	*151736*	*121133*	*87419*	*53503*	*498724*

	1910-1930-1940-1960 pooled samples			***1940-1960 pooled samples***		
Dependent variable:			=1 if currently working			
	35-44	45-59	45-64	35-44	45-59	45-64
			assignment by birth state			
frate_GD*d1930	-0.009	-0.004	-0.009			
	(0.011)	(0.010)	(0.009)			
frate_GD*d1940	-0.023	-0.012	-0.028			
	(0.018)	(0.009)	(0.013)**			
frate_GD*d1960	-0.009	0.009	0.003	0.008	0.014	0.017
	(0.013)	(0.012)	(0.011)	(0.006)	(0.005)***	(0.005)***
N	208562	215422	260044	140485	151787	183895
			assignment by current state			
frate_GD*d1930	-0.005	0.019	0.014			
	(0.015)	(0.017)	(0.017)			
frate_GD*d1940	-0.001	0.011	-0.004			
	(0.021)	(0.014)	(0.015)			
frate_GD*d1960	0.002	0.026	0.022	-0.001	0.006	0.013
	(0.018)	(0.012)**	(0.012)*	(0.005)	(0.005)	(0.006)***
N	*208698*	*215437*	*260041*	*140615*	*151797*	*183887*

Notes: See notes to Tables 2 and 3. The sample includes white men, residing in non-farm households, born in the United States and not in group quarters. ***, **, * indicate significance at 1%, 5% and 10% respectively.

white-collar employment as well as the diffusion of home technology - do not confound the effects of the Great Depression. In this section, we examine one plausible mechanism through which the latter could have impacted female employment decades later: its effect on the labor supply and wages of the husbands.

To begin with, in the first part of Table 11, we pool the 1910-1930-1940 cross sections and present estimates of specification (1) for men using current work status and being out the labor force as outcome variables. The results suggest that workshares of older men decline in states more severely impacted by the Crash, while men from nearly

all age groups exited the labor force. In the second part of Table 1, we present the long-term effects of the Great Depression on the labor supply of men estimating specifications (2) and (3) on the pooled 1910-1930-1940-1960 and 1940-1960 samples. The estimates suggest that men 45 to 64 years old in 1960 tend to work more in states that were harder hit by the Great Depression.

Table 12: Impact of the Great Depression on male wages (1940-1960)

Ages in year *t*	35 to 44	45 to 59	45 to 64
	assignment by state of birth		
	OLS - Baseline		
frate_GD*d1960	0.004	-0.020	-0.020
	(0.014)	(0.011)*	(0.011)*
N	*87656*	*83580*	*97730*
	Heckman-corrected estimates		
frate_GD*d1960	-0.002	-0.023	-0.026
	(0.017)	(0.011)**	(0.012)**
Inverse mills ratio	-0.484	-0.567	-0.582
	(0.012)***	(0.016)***	(0.016)***
N	*126883*	*134161*	*162870*
	assignment by current state (OLS)		
frate_GD*d1960	0.002	-0.034	-0.024
	(0.010)	(0.013)***	(0.011)**
N	*87758*	*83586*	*97725*

Notes: See notes to Table 4.

In Table 12 we present estimates of specification (2) using real weekly log-wages as our outcome variable. Interestingly we find that the same cohort of men – 45 to 64 years old in 1960 – earns less in states more impacted by the Crash several decades after it had ended. We conclude that the results on the labor supply and wages are suggestive of a labor supply shift for men as well induced by the Great Depression. These men were likely married to women in the *D-cohort* and likely faced significant and persistent declines in their permanent income that made it necessary for them and their spouses to enter the market and work for an extended period of time.

VII. Conclusion

This paper documents a novel link between the dramatic increase in the labor supply of older women in the 1950s and events dating back to the Great Depression. In states

were economic conditions deteriorated the most, women of working age in 1930 or who turned working age in the early 1930s, entered the market in the short-run to compensate for income or asset losses and either remained or exited and re-entered the labor market, where they worked till their retirement years. The entire lifetime labor supply profile of this cohort is persistently linked to the economic conditions of the Great Depression. This result is found across several IPUMS samples and is robust to a wide range of specification and identification exercises as well as measures of the economic downturn. Moreover, it is consistent with the hypothesis of a labor supply shift as the wages of these women were lower several decades after the Crash in states most impacted by it. We also found that the wages of the men who were of age to be married to women in this cohort were systematically lower many years after. This suggests the reduction in households' permanent income as a plausible channel for the increased participation of women in the *D-cohort* in the 1940s and the 1950s, decades after the Depression years. [28]

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