Financial Deregulation and Fertility Decisions:
The Unintended Consequences of Banking Legislation

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Motivation

- Populations in the developed world are getting older and fertility rates are falling
- At the same time, exuberant house prices pose challenges for policy makers and home buyers alike
- An increasing number of papers find a link between house prices and fertility decisions (Li, 2023; Dettling and Kearney, 2014; Daysal et al., 2021)
- We exploit a stylised fact of MacroFinance (Mian et al., 2020; Favara and Imbs, 2015): Bank deregulation $\rightarrow$ House Price Booms
- We focus on the USA's 1980s wave of Banking Deregulation and study its fertility implications:
  - Mothers' Age at First Childbirth (MAFC)
  - Fertility Rates

Bank Deregulation

- "[Banking] Regulation influences banks' beahaviour by shaping the competitive environment and setting the parameters within which banks are able to pursue their economic objectives". (Bank of England, 2010)
- Bank deregulation enables credit booms
  - credit to entrepreneurs can facilitate innovation, economic growth and employment (Jayaratne and Strahan, 1996; Black and Strahan, 2002)
  - mortgage booms can lead to house price booms (Justiniano et al., 2019; Saadi, 2020)
- The USA has experienced two Banking Deregulation waves
  - First wave: The 1970s and 1980s
  - Second wave: The late 1990s and early 2000s

The USA's 1980s Banking Deregulation Wave

- It involved
  - Intrastate Deregulation : branch expansions within state
  - Interstate Deregulation : banking expansions into other states
- It has been shown to be exogenous to state level economic conditions (Jayaratne and Strahan, 1996; Kroszner and Strahan, 2014)
  - The exogeneity condition is even more likely to hold for fertility outcomes
- Mian et al. (2020) have shown that the USA's 1983 to 1989 Business Cycle Expansion was amplified in states that deregulated earlier
  - They build a time-invariant deregulation index (the MSV-score)
  - For a given state, the higher the MSV-score is, the further back with respect to 1989 it had begun its intra- and interstate deregulation process

Contribution

- Previous findings
  - Kim et al. (2022) studied the USA's first wave of Banking Deregulation
    - They focus on short-horizons and report a positive effect on fertility rates
  - Yang (2023) studied the USA's second wave of Banking Deregulation
    - She reports a negative effect on fertility rates and a positive effect on MAFC
- We study the first Banking Deregulation wave
  - We build a panel at the county level and explore effects conditional on different socio-demographic characteristics
  - We use a staggered diff-in-diff methodology
  - We show that the first wave also increased MAFC
  - We reconcile the previous seemingly contradictory results on Fertilty Rates
    - Upon the first wave of Deregulation we first observe a short-lived increase in fertility rates (the time period analysed by Kim), and then a bust in fertility rates (corresponding to the time period of Yang)

Channels

- Bank Deregulation can affect fertility decisions through 3 channels (Yang, 2023; Hacamo, 2021):
  1. House Price Channel, which has two, partially offsetting, faces:
     - House Cost Channel: $\downarrow$ Fertility Rate & $\uparrow$ MAFC
     - House Wealth Channel: $\uparrow$ Fertility Rate & $\uparrow$ MAFC
  2. Labour Market Channel: $\downarrow$ Fertility Rate & $\uparrow$ MAFC
  3. Credit Market Channel: $\uparrow$ Fertility Rate & $\downarrow$ MAFC
- The relative strength of each channel varies across households depending on their soicoeconomic characteristics
- We proxy for these socieconomic characteristics by mothers' race and education

▸ Wealth and Homerownership by Race

What we find

- Ten years after treatment, MAFC increased by 4 months after intrastate deregulation, and by 1 year after interstate deregulation
- The average effect on total fertility is positive over short horizons, but reverts back to zero over longer horizons
- Effects difer by socio-demographic characteristics
  - Non-white women exhibit a stronger MAFC increase and a stronger bust in fertility rates
    - Non-White women are more vulnerable to the house cost channel
    - White women benefit more from the house wealth channel
  - College-educated women experience a stronger MAFC increase
    - College-educated women have higher wage-opportunity costs

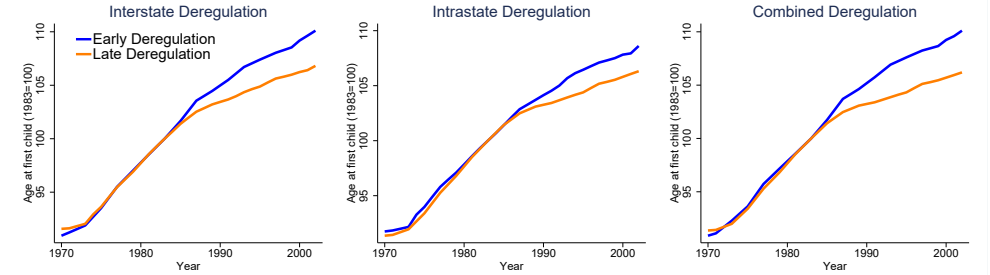
Data and Trends

Data

- National Vital Statistics System of the National Center for Health Statistics
  - Mothers' Age at First Childbirth (MAFC)
  - Number of births in a given county
- Survey of Epidemology and End Results for county-level population data
- Mian et al. (2020) and Amel (1993) for the timing of intra- and interstate deregulation for each US state
- Federal Housing Finance Agency for state-level House Price Index (HPI)
- Bureau of Economic Analysis for state-level GDP and Income per capita
- Den Haan et al. (2007) for state-level credit data

The resulting dataset has over 7500 observations, covering 228 counties across 31 US states from 1970 to 2000 ▸ 31 States

Banking Deregulation and MAFC trends

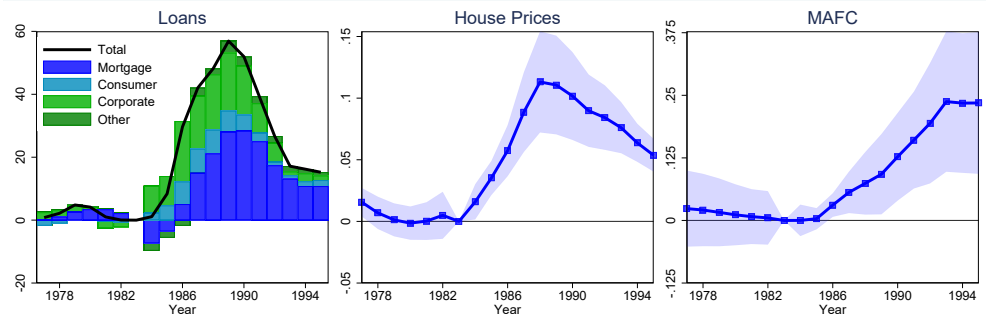


- An Early Interstate (Intrastate) Deregulation state is one who began Intrastate (Intrastate) Deregulation in 1983 or earlier
- An Early Combined Deregulation state is one who had began both types of deregulation in 1983 or earlier
- ▸ Trends in GDP Credit, House Prices

The effect of deregulation

The Amplification of the 1980s Banking Deregulation Wave

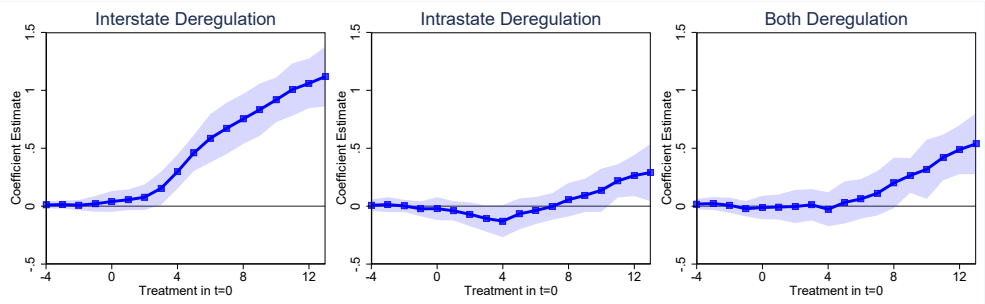
$$Y_{i,t} = \alpha_i + \lambda_t + \sum_{q \neq 1983} \beta_q \times \mathbf{1}_{[t=q]} \times MSV\text{-}Score_i + \varepsilon_{i,t}\,. \tag{1}$$



Empirical Strategy

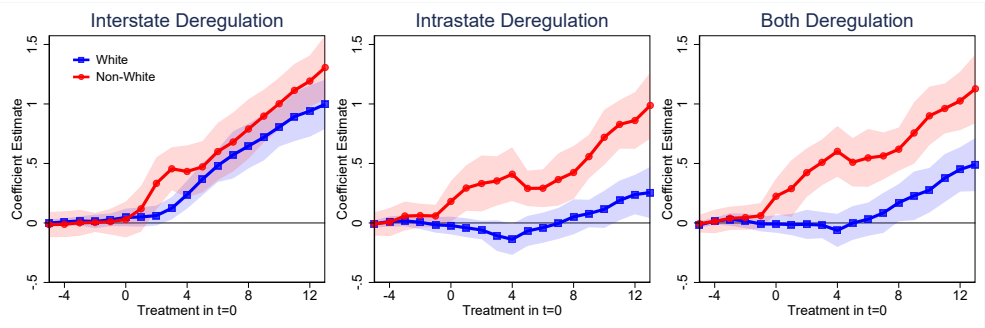
- Roth et al. (2023) and Baker et al. (2022) have shown that the traditional static and dynamic diff-in-diff models may suffer from econometric and interpretational issues when
  - treatment is not implemented at the same point in time across units
  - treatment effects vary depending on when treatment was administered
- In our setting, the effect of deregulation taking place prior or during the 1980s expansion is likely to be different from the effect of deregulation if administered during the 1990s recession
- We opt for the staggered diff-in-diff approach of Borusyak et al. (2022)
- Average Treatment effect on the Treated is based on differences with respect to the pre-treatment period average ▸ The BJS staggered diff-in-diff model

Baseline Results on MAFC



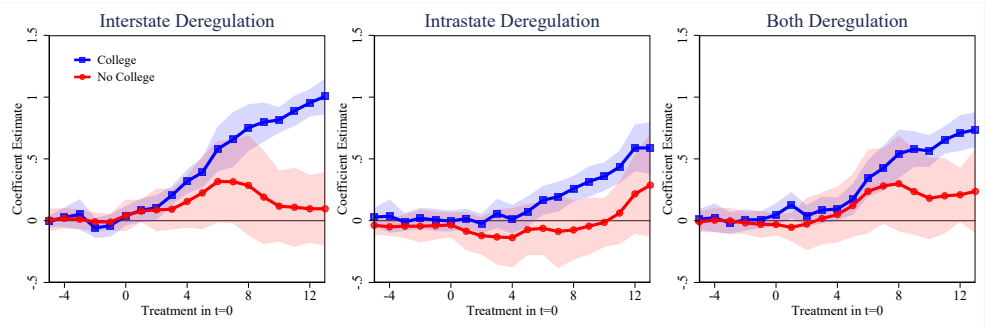
- MAFC increases between 4 and 12 months over a 10 year horizon
- The response takes a while to pass through because
  - House Prices must increase first
  - Houe Prices need to remain exuberant for several periods
  - Birth Certificate data reflects a decision taken, at least, 9 months ago

Results on MAFC by Mothers' Race



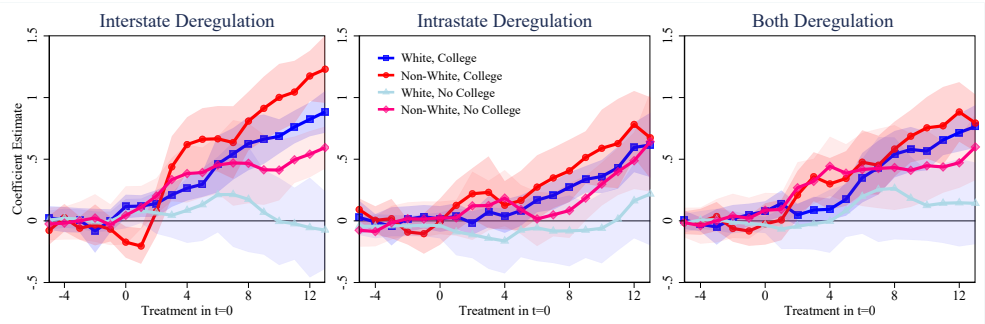
- The increasing effect on MAFC is stronger for non-white women
- Non-white households have significantly lower homeownership rates and are more financially constrained. Consequently, they are more exposed to the affordability delaying effect of the house cost channel

Results on MAFC by Mothers' College Education



- The increasing effect on MAFC is stronger for college educated women
- In addition to the fact that college itself delays the timing of motherhood, college educated women probably faced higher wage-opportunity costs during the 1980s deregulation-amplified USA expansion

Results on MAFC by Mothers' College Education and Race



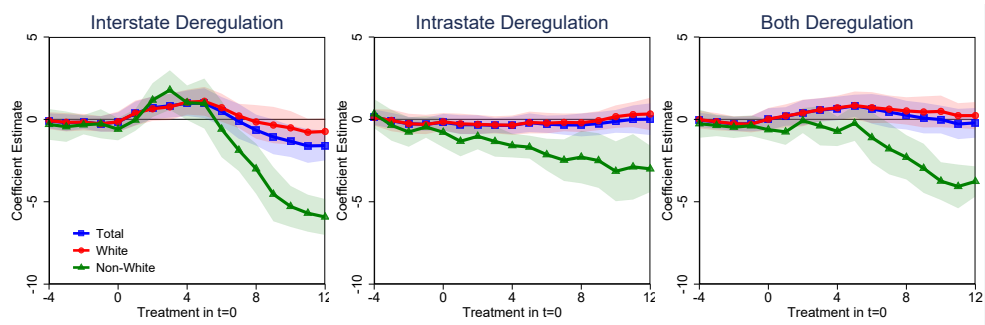
- The effect of deregulation is similar for white and non-white college educated women
- The differences are larger between white and non-white non-college educated women

Fertility Rates during Boom and Bust

$$\Delta_7 FertRate_{i,t} = \alpha + \beta^{MSV} \times MSV\text{-}Score_i + \beta^{Z} \times Z_i + \varepsilon_i\,, \tag{2}$$

	Birth Rate by Race$_i$								
	$\Delta_{1976-1983}$			$\Delta_{1984-1991}$			$\Delta_{1992-1999}$		
	All (1)	White (2)	NonWhite (3)	All (4)	White (5)	NonWhite (6)	All (7)	White (8)	NonWhite (9)
MSV-Score$_i$	- 0.39	- 0.49	0.19	1.51***	1.54***	0.83	- 0.45***	- 0.40**	- 0.89***
	(0.39)	(0.40)	(0.42)	(0.34)	(0.35)	(0.65)	(0.14)	(0.18)	(0.31)
R^2	0.020	0.030	0.001	0.249	0.251	0.016	0.047	0.032	0.027
Observations	228	228	228	228	228	228	224	224	224

Fertility Rates and Deregulation, by Race



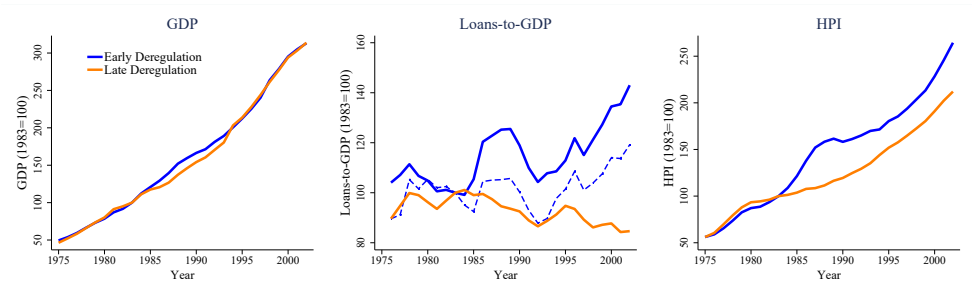
- The overall negative effect on fertility rates is stronger for non-white women

Conclusion

- The 1980s Banking Deregulation Wave had fertility implications
  - Ten years after treatment, MAFC increased between 4 to 12 months
  - The average effect on fertility rates in positive over short-horizons but reverts back to zero over longer horizons
- Heterogeneity
  - Highest effect on college educated non-white women
    - The subsample most exposed to the wage-opportunity cost AND most vulnerable to house price increases
  - Lowest effect on non-college educated white women
    - The subsample with smallest wage-opportunity costs AND less vulnerable to house price increases

Appendix

Bank Deregulation and trends in GDP, Credit and House Prices



- An Early (Late) Deregulation state is one whose MSV-score is above (below) 0

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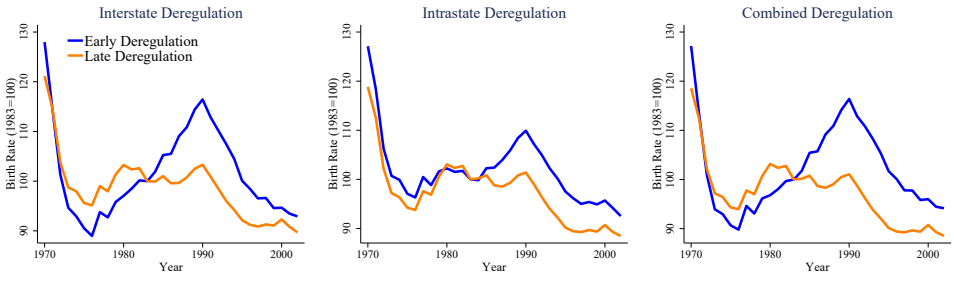
Banking Deregulation and trends in Fertility Rate



The BJS staggered diff-in-diff model

- For each unit i, treatment takes place at time g_i. Therefore, at time t we have:
  - Not-yet treated observations: $t < g_i$
  - Treated observations: $t > g_i$
- The pre-treatment average of the BJS-estimator is computed with the following TWFE-regression using only not-yet treated observations

$$Y_{i,t} = \alpha_i + \lambda_t + \varepsilon_{i,t} \ \ | t < g_i. \tag{3}$$

- From which the never treated potential outcome for each unit, $\widehat{Y}_{i,t}(\infty)$, is inferred
- The treatment effect on unit i: $\widehat{\beta}_{BJS(i,t)} = Y_{i,t} - \widehat{Y}_{i,t}(\infty)$
- Average treatment effect at horizon p: the average of the individual treatment estimates p periods after treatment

$$\widehat{ATT}_{BJS(p)} = \frac{1}{N} \sum_{i}^{n} \widehat{\beta}_{BJS(i,t=g_i+p)}, \tag{4}$$

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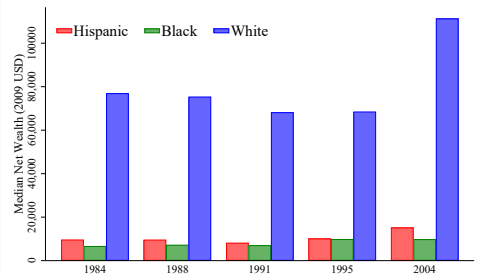
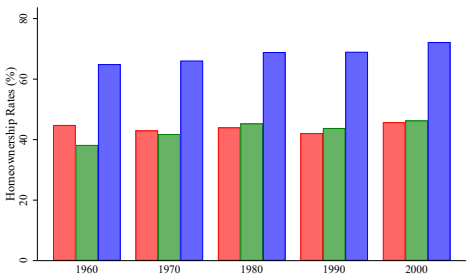
Wealth and Homeownership Rates by Race





- Data on median net wealth is from Taylor et al. (2011). Data on homeownership rates is from Coulson and Dalton (2010)

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The 31 States

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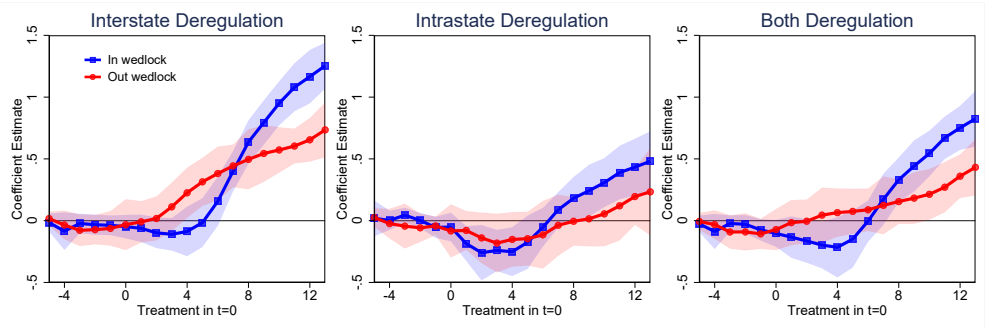
Early Deregulated State				Late Deregulated States (cont.)			
State	intra	inter	MSV-score	State	intra	inter	MSV-score
Alabama	1981	1987	0.7243	Indiana	1989	1986	-0.6300
Connecticut	1980	1983	1.6917	Iowa	1994	1991	-1.2105
Georgia	1983	1985	0.7243	Kansas	1987	1992	-0.8235
Massachusetts	1984	1983	0.9178	Kentucky	1990	1984	-0.2431
New Jersey	1977	1986	1.3047	Louisiana	1988	1987	-0.6300
New York	1976	1982	2.0786	Michigan	1987	1986	-0.2431
Ohio	1979	1985	1.4982	Minnesota	1993	1986	-0.63
Oregon	1985	1986	0.1439	Mississippi	1986	1988	-0.4366
Pennsylvania	1982	1986	0.7243	Missouri	1990	1986	-0.6300
Tennessee	1985	1985	0.3373	Nebraska	1985	1990	-0.4366
Utah	1981	1984	1.3047	New Mexico	1991	1989	-1.2105
Late Deregulated States				Oklahoma	1988	1987	-0.6300
Arkansas	1994	1989	-1.2105	Texas	1988	1987	-0.6300
Colorado	1991	1988	-1.017	Washington	1985	1987	-0.0496
Florida	1988	1985	-0.2431	West Virginia	1987	1988	-0.6300
Illinois	1988	1986	-0.4366	Wisconsin	1990	1987	-0.8235

Results on MAFC by Mothers' Marital Status



- The overall increasing effect on MAFC is stronger for married women
- In the short-term, however, married women experience a slight decrease in MAFC. Given that married women are older, they have a higher probability of being homeowners, who in the short-term benefit from an unexpected wealth gain