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What Remains After the Oil Boom Is Over?

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Abstract

This paper links between Beckerian literature that shows that marriage is a normal good with respect to male income and the literature that explores cultural changes as a result of exogenous events. I use the oil crisis of the 1970s as a positive shock on some males. The analyzed outcome is marital status at early twenties for women and at mid and late twenties for men. The probability to be never-married is significantly lower in the oil-producing than in other American areas immediately after the shock. This effect persists after the oil boom is over but longer for men than for women.

1   Introduction

This paper is related to two broad topics in economics. The family economics literature shows that better opportunities for men are related to higher marriage rates in general and at a young age in particular (Blau et al., 2000, Wilson, 2012, Schaller, 2016, Autor et al., 2018). Another literature explores long-run cultural changes as a result of exogenous events, in particular as a result of shocks related to natural resources. For example, Brodeur & Haddad (2018) and Tolonen (2018) find more liberal values in areas exposed to gold mining, while Couttenier et al. (2017) show that places where mineral discoveries occurred before formal institutions were established are more violent to this day.

I consider the oil price boom of the 1970s. During the boom, the income of men occupied in mining and related industries in oil areas of the United States boomed, while other sectors, such as agriculture, suffered. I explore the effect of the boom on the probability to marry young. With respect to the fact that women generally marry at a younger age than men, I consider the marital status of women at age 21 and of men at ages 25 and 29. I find that immediately after the shock, the probability to be never-married is significantly lower in the oil-producing than in other areas of the United States, similarly for both genders. This result is consistent with others in family economics and joins other findings in the context of natural resources booms (Løken, 2010, Acemoglu et al., 2013, Black et al., 2013, Maurer & Potlogea, 2014, Fedaseyeu et al., 2015). The long-run effect is more tricky. For both genders it persists longer than the oil boom. However, for women the effect gradually diminishes. By contrast, it does not diminish for men.

2   The 1970s Oil Boom

The members of the Organization of Arab Petroleum Exporting Countries proclaimed an oil embargo in October 1973. By the end of the embargo in March 1974 the price of oil had risen from \$3 per barrel to nearly \$12 globally. The prices in the U.S. were significantly higher. It was followed by the second shock of 1979. This boom was the greatest in the twentieth century and was over by the second half of the 1980s. The next boom of a similar scale started in 2004 (see Figure 1 for the history of the oil price).

3   Data

The data is the American Censuses of 1980, 1990, and 2000 (Ruggles et al., 2017). From 1980 to 2011 (but not earlier), the American Census allows to follow a geographical unit

Figure 1: Historical crude oil price, 1861 to present

Source: http://chartsbin.com/view/oau.
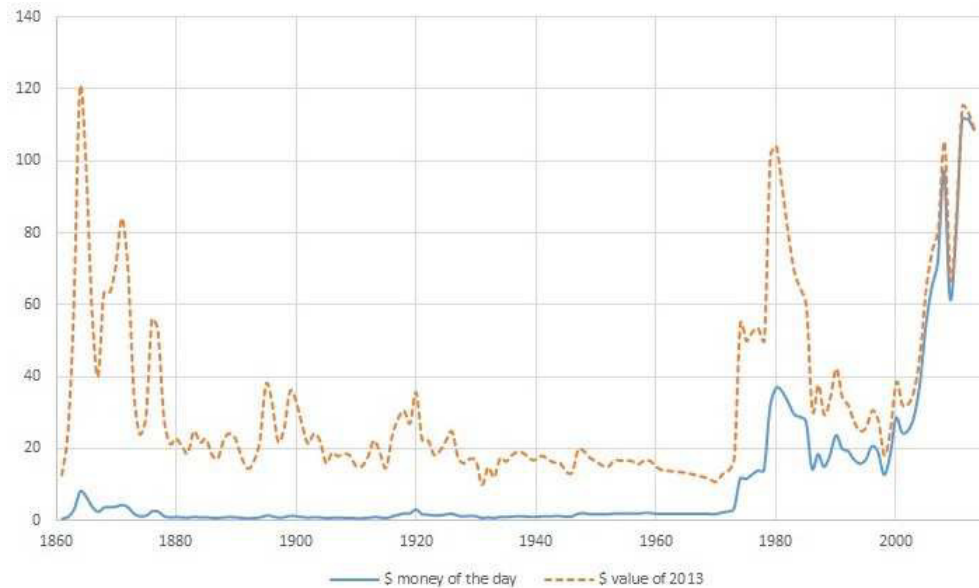
smaller than a state - the *consistent Public Use Microdata Area* (conspuma). This is the most detailed area that can be consistently delineated from the geographic codes. I limit the years to 1980-2000, because the next dataset that reports conspuma is the American Community Survey of 2005, collected during a new oil boom. Even though conspuma cannot be tracked before 1980, the Census of 1980 includes (and is the last census to do so) the variable of age at first marriage. Thus, marital status at different ages can be retrospectively calculated for earlier years. For instance, a married 25 years old who first married at age 24, is a never-married 21 years old. The marital status at the day of the interview is an outcome that appears in all three Censuses (1980, 1990, and 2000). Marital status at a particular age allows for estimation of the interaction effect between the oil boom and year of birth.

4   Econometric model

I use a difference in difference estimator with continuous treatment intensity. Because the Census of 1980 is the only data set, collected during the boom years, that allows for calculation of labor shares on conspuma level, treatment is defined as oil intensity in 1980. It is the share of oil-extraction workers out of the 16-35 years old male labor force. I assume that

Oil-extracting workers out of the 15-35-year-old male labor force in 1980

Mean	Std. dev.	Min.	Max.	Number of conspumas
			All conspumas	
0.008	0.022	0	0.184	543
		Conditional on a positive value		
0.011	0.025	0.0001	0.184	394

oil intensity in 1980 is a good proxy for all boom years from 1974 on. The specification is

$$S(a)_{ijt} = BirthYear_{ijt} \times Oil1980_j \alpha + X_{ijt}\beta + u_{ijt}$$

where $S(a)_{ijt}$ is the never-married dummy at the a-th birthday of a person i who lives in conspuma j and was born in year t. $Oil1980_j$ is the conspuma's oil intensity. $BirthYear_{ijt}$ is a vector of dummy variables for years of birth. For a person i who lives in conspuma j, this vector has one for year t and zero for other years. The reference group includes those born between 1930 and 1939. Whenever the 1980 Census can be used to extract the retrospective marital status at the age of interest, the years of birth have no gaps. Whenever later Censuses are used, there are forced gaps between the years of birth. X are fixed effects of conspumas, years of birth, and whites. Table I presents the summary statistics of oil intensity. The mean oil intensity is 0.8%, but in only 394 out of the 543 conspumas is it positive. Among these conspumas, the mean oil intensity is 1%. I estimate the model with and without zero-oil conspumas, but I do not find any difference in the results and report here only the results for the full sample.

The estimation procedure is the linear probability model with standard errors clustered by conspuma. The sample is restricted to individuals reporting the same state as state of birth as the state of residence. Unfortunately, intra-state migration cannot be consistently controlled for. However, one should remember that male migration into oil areas works *against* male marriageability.

5 Results

Tables II and III report the results for women and men, respectively. The estimates show that in line with the parallel trends assumption, the cohorts that entered the marriage market before the oil boom did not experience a systematically different probability of early marriage as a function of the 1980 oil intensity in their conspuma. The effect of the oil boom is very clear. The female cohort of 1954, who were 21 years old in 1975, are much less likely

to be never-married than those who were 21 years old earlier. The effect escalates and is maximal for those who were born in 1959. It declines afterward. For the 1969 birth cohort, the effect is half as much as during the crisis years and for the 1979 birth cohort it is back to the pre-boom level and statistically zero. The results for men show a similar effect of the boom. Men who were born in 1949 (and are 25 years old in 1974) are much less likely to be never-married at the age of 25 than their older counterparts. Correspondingly, men who were born in 1945 (and are 29 years old in 1974) are much less likely to be never-married at the age of 29. The effect on men does not disappear after the boom. It is still observed for those born in 1975.

6   Discussion

The empirical results show three findings. First, from the beginning of the oil boom, men and women in the oil-producing areas experienced a significantly higher probability of marrying young than those in the non-oil-producing areas. Second, this effect persists after the oil boom is over. Third, the persistence is longer for men than for women. We shall discuss each of these findings in turn.

The first result is in line with Becker's (Becker, 1973) theory on the positive relationship between intra-household specialization and gains from marriage. A higher gender gap is related to a higher degree of specialization and higher gains from marriage. Mining and the related construction and transportation industries are overwhelmingly male-dominated and positive shocks to these industries contribute to the gender gap. Blau et al. (2000), Wilson (2012), Schaller (2016), and Autor et al. (2018), among others, cite Becker's model to explain their empirical findings on the positive effects of economic opportunities for men and the negative effects of economic opportunities for women on marriage and fertility rates.

Yet these effects are not at all obvious. An increased level of inequality within the male population can be related to a longer search for a spouse (Loughran, 2002, Gould & Paserman, 2003). The oil boom can lead to increased inequality if it positively affects only a portion of the male population or if positively affected and negatively affected men (for example, miners and farmers) participate in the same marriage market. This effect might counteract the Becker's effect, but only if male inequality increases within the search pools and not just overall. By contrast, if the oil boom leads to decreased male inequality within the search pools, the marital search can become shorter. This may well be the case if the marriage market is a small community without much sectoral diversity. In addition, a lower level of economic uncertainty has also been shown to be theoretically related to earlier marriage (Bergstrom & Bagnoli, 1993).

The persistence of the effect after the oil boom is over may be attributed to the longevity

Table II: Difference in difference effects for women

	Never-married at the 21st birthday		
Oil intensity in 1980 interacted with a dummy for year of birth reference group: 1930-1939		*continued*	
1940	0.202* (0.117)	1951	0.0172 (0.117)
1941	0.156 (0.137)	1952	-0.162 (0.124)
1942	0.0753 (0.111)	1953	-0.174 (0.130)
1943	0.0344 (0.102)	1954	-0.420*** (0.102)
1944	0.0891 (0.127)	1955	-0.416*** (0.111)
1945	0.0385 (0.129)	1956	-0.538*** (0.156)
1946	0.185* (0.111)	1957	-0.434** (0.177)
1947	-0.175* (0.0962)	1958	-0.626*** (0.164)
1948	0.142 (0.100)	1959	-0.689*** (0.193)
1949	-0.0137 (0.0904)	1969	-0.393* (0.221)
1950	-0.0127 (0.0981)	1979	-0.169 (0.194)
		White	-0.109*** (0.00947)
		Conspuma FE	yes
		Year of birth FE	yes
		Observations	1,463,749

The estimation procedure is the linear probability model with standard errors clustered on conspuma level.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table III: Difference in difference effects for men

| | Never-married at the | | | Never-married at the | |
	25th birthday	29th birthday		25th birthday	29th birthday
Oil intensity in 1980 interacted with a dummy for year of birth Reference group: 1930-1939				*continued*	
1940	0.111 (0.127)	0.0205 (0.0774)	1950	-0.373*** (0.113)	-0.552*** (0.109)
1941	0.0512 (0.0931)	-0.0805 (0.0739)	1951	-0.608*** (0.131)	-0.442*** (0.157)
1942	-0.0103 (0.0860)	-0.0893 (0.0672)	1952	-0.611*** (0.117)	
1943	-0.0742 (0.147)	-0.105 (0.0838)	1953	-0.800*** (0.134)	
1944	0.0105 (0.109)	-0.0559 (0.0711)	1954	-0.734*** (0.202)	
1945	0.0240 (0.101)	-0.205** (0.0877)	1955	-0.869*** (0.178)	
1946	-0.113 (0.108)	-0.296*** (0.0615)	1961		-0.910*** (0.170)
1947	-0.132 (0.0982)	-0.265*** (0.0833)	1965	-0.770*** (0.199)	
1948	-0.105 (0.0930)	-0.302*** (0.0824)	1971		-1.222*** (0.213)
1949	-0.299*** (0.102)	-0.531*** (0.0900)	1975	-1.313*** (0.248)	
			White	-0.109*** (0.00705)	-0.108*** (0.00548)
			Conspuma FE	yes	yes
			Year of birth FE	yes	yes
			Observations	1,148,041	919,814

The estimation procedure is the linear probability model with standard errors clustered on conspuma level.

*** p<0.01, ** p<0.05, * p<0.1

of social phenomena, such as family values and gender roles, beyond the exogenous circumstances that generate these phenomena. This persistence has been shown in a burgeoning literature, including but not limited to Fernandez & Fogli (2009), Alesina et al. (2013), Brodeur & Haddad (2018), and Tolonen (2018). Cultural transmission is a mechanism that has been identified throughout this literature. My empirical analysis considers a relatively short period of time, and the relevant cultural transmission mechanism is more likely to be oblique or horizontal (which means social imitation and learning) rather than vertical (which means intergenerational transmission within the family).[1]

Finally, it is of little surprise that the persistence of the oil boom effect is longer for men than for women. One would not expect the long-run effect of the oil boom on the marriage status of young women to be robust to the profound changes that took place throughout the United States during the last decades of the twentieth century (Blau et al., 2000, Goldin, 2006, Greenwood et al., 2016). The marital status of women in their early twenties is naturally more sensitive to an increase in female educational attainment and female labor market opportunities than the marital status of older men is. Moreover, a faster decline in marriage rate of young women than in that of older men is also in line with the narrowing of the spousal age gap. Consider, for example, the changes in the median age at first marriage in the U.S. between 1980 and 2000. The gap between the median ages at first marriage of men and women decreased from 2.7 to 1.7 years.[2] Thus, up to the end of the twentieth century, the spousal age gap decreased by more than one third of its value since 1980. It is natural to expect that the effect of the oil boom on the marriage rate of young women in oil-producing areas gradually vanishes in the presence of such revolutionary changes as those experienced by American women toward the end of the twentieth century.

7 Conclusions

The decades following the 1970s oil boom overlap with the period of increasing age of marriage overall in the U.S.. Nevertheless, following the crisis, oil-producing areas plot a significantly lower probability to be never-married at a young age than non-oil producing ones. The persistence of this effect for men after the boom is over goes beyond the immediate income effect of the boom. With respect to the fact that between 1986 and 2003, the oil price did not experience fluctuations of the scale similar to the boom period, this result may be related to a deeper and longer change in the propensity of an early marriage.

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[1]I adopt here the distinction suggested in Bisin & Verdier (2011).

[2]Source: U.S. Census Bureau, Current Population Survey, March and Annual Social and Economic Supplements.

References

Acemoglu, D., Finkelstein, A., & Notowidigdo, M. J. (2013). Income and health spending: Evidence from oil price shocks. *Review of Economics and Statistics*, *95*(4), 1079–1095.

Alesina, A., Giuliano, P., & Nunn, N. (2013). On the origins of gender roles: Women and the plough. *The Quarterly Journal of Economics*, *128*(2), 469–530.

Autor, D., Dorn, D., Hanson, G., et al. (2018). When work disappears: Manufacturing decline and the falling marriage-market value of young men. *American Economic Review: Insights*.

Becker, G. S. (1973). A theory of marriage: Part i. *Journal of Political economy*, *81*(4), 813–846.

Bergstrom, T. C., & Bagnoli, M. (1993). Courtship as a waiting game. *Journal of political economy*, *101*(1), 185–202.

Bisin, A., & Verdier, T. (2011). The economics of cultural transmission and socialization. In *Handbook of social economics* (Vol. 1, pp. 339–416). Elsevier.

Black, D. A., Kolesnikova, N., Sanders, S. G., & Taylor, L. J. (2013). Are children normal? *The review of economics and statistics*, *95*(1), 21–33.

Blau, F. D., Kahn, L. M., & Waldfogel, J. (2000). Understanding young women's marriage decisions: The role of labor and marriage market conditions. *ILR Review*, *53*(4), 624–647.

Brodeur, A., & Haddad, J. (2018). Institutions, attitudes and lgbt: Evidence from the gold rush.

Couttenier, M., Grosjean, P., & Sangnier, M. (2017). The wild west is wild: The homicide resource curse. *Journal of the European Economic Association*, *15*(3), 558–585.

Fedaseyeu, V., Gilje, E., & Strahan, P. E. (2015). *Voter preferences and political change: Evidence from shale booms* (Tech. Rep.). National Bureau of Economic Research.

Fernandez, R., & Fogli, A. (2009). Culture: An empirical investigation of beliefs, work, and fertility. *American Economic Journal: Macroeconomics*, *1*(1), 146–77.

Goldin, C. (2006). The quiet revolution that transformed women's employment, education, and family. *American economic review*, *96*(2), 1–21.

Gould, E. D., & Paserman, M. D. (2003). Waiting for mr. right: rising inequality and declining marriage rates. *Journal of Urban Economics*, *53*(2), 257–281.

Greenwood, J., Guner, N., Kocharkov, G., & Santos, C. (2016). Technology and the changing family: A unified model of marriage, divorce, educational attainment, and married female labor-force participation. *American Economic Journal: Macroeconomics*, *8*(1), 1–41.

Løken, K. V. (2010). Family income and children's education: Using the norwegian oil boom as a natural experiment. *Labour Economics*, *17*(1), 118–129.

Loughran, D. S. (2002). The effect of male wage inequality on female age at first marriage. *Review of Economics and Statistics*, *84*(2), 237–250.

Maurer, S., & Potlogea, A. (2014). Fueling the gender gap? oil and women's labor and marriage market outcomes. *CEP Discussion Paper*(1280).

Ruggles, S., Genadek, K., Goeken, R., Grover, J., & Sobek, M. (2017). Integrated public use microdata series: Version 7.0 [american community survey, 2016]. *Minneapolis: University of Minnesota*.

Schaller, J. (2016). Booms, busts, and fertility testing the becker model using gender-specific labor demand. *Journal of Human Resources*, *51*(1), 1–29.

Tolonen, A. (2018). Endogenous gender norms: Evidence from africas gold mining industry.

Wilson, W. J. (2012). *The truly disadvantaged: The inner city, the underclass, and public policy*. University of Chicago Press.