The Power of Contraception in Australia

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May 21, 2018
First version: 2017

Abstract

This paper compiles a history of Australian age of majority laws and mature minor doctrines to build a measure of when women aged 18–20 in different Australian states had legal autonomy in making medical decisions. We use variation in the between-states timing of autonomy to identify the effect of autonomy on incomes, completed fertility, education level, labor supply, career choice, and age at first marriage using the Australian Census of Population and Housing. Estimates of effects are broadly consistent with but somewhat smaller than those from the US. We extend past work on the US population by estimating the effect of autonomy on oral contraceptive use in a synthetic monthly panel of Australian women from the Australian Family Project.

***Note to the reader**: we are in the process of refining the scope of this paper. At present, it communicates results as if age of majority laws and mature minor doctrines represent as-good-as-random assignment of access to oral contraceptives, but we do not believe that this is a reasonable interpretation of those legal changes. Instead, we will soon modify the language to more fully incorporate the fact that these changes could impact other aspects of economic freedom for both young women and young men.*

1 Introduction

Goldin and Katz (2002) made a groundbreaking contribution to our understanding of women's economic freedom by using differently-timed changes in state age of majority laws and mature minor doctrines in the United States as potentially exogenous variation in the cost of obtaining and using oral contraceptives ("the Pill"). Their work, and others' extensions of this framework (Ananat and Hungerman, 2012; Bailey, 2006; Bailey, Guldi, Davido, et al., 2011; Bailey, Hershbein, and Miller, 2012; Browne and LaLumia, 2014; Hock, 2007) showed that unmarried women in cohorts that gained the ability to legally make their own medical decisions in late adolescence and early adulthood had later fertility, higher incomes late in life, and more educational attainment and were more likely to participate in careers that had been historically male. As far as we know, all of the work to date using this identification strategy has focused on people in the United States. We show that many of the same arguments for the value of legal changes in the US as exogenous shocks also apply in Australia and use the same framework to analyze the effect of legal autonomy on lifetime income paths, educational attainment, completed fertility, and career choice for women in Australia.

Martha Bailey and her colleagues (Bailey, 2006; Bailey, Guldi, Davido, et al., 2011; Bailey, Hershbein, and Miller, 2012) further developed our knowledge of the legal environments and extended the analysis to new data sets. Hock (2007) and Browne and LaLumia (2014) used the framework to analyze college attainment and poverty, respectively. Ananat and Hungerman (2012) showed some reductions in the average level of education of the cohorts of children born to women treated with early contraceptive access (by differentially reducing the fertility of women of with different propensities toward college education). They found little evidence that these composition effects on future cohorts were stable or important. Myers, 2017 argues that errors in other researchers' data caused them to conflate effects of abortion policy with effects of the pill. Bailey, Guldi, and Hershbein, 2013 provide additional evidence on the validity of the Early Legal Access framework for identifying plausibly exogenous variation in the costs of obtaining oral contraceptives.

Oral contraceptives became available in Australia in 1961, and, as we will show, their use quickly spread in the early 1970s—when Australian states were lowering their ages of majority from 21 to 18. However, unlike in past papers, we do not argue that the legal changes we describe represent as-good-as-random assignment of access to oral contraceptives. Instead, we believe that these changes could impact other aspects of economic freedom for both young women and young men. Thus we eschew the term "Early Legal Access" popularized by Bailey (2006) and instead use more general terms like "youth consent".

We also believe that the case for exogeneity of legal changes relative to the existing culture in a state is weaker in Australia than in the US (e.g. Bailey, Guldi, and Hershbein (2013) and Hock (2007)), but we attempt to provide the evidence where it exists and believe the contexts that generated the legal changes in the US and Australia are similar enough that those who accept exogeneity in the US case should at least see the results presented here as suggestive.

2 Overview of youth consent and abortion laws in Australia

2.1 Age of majority and mature minor doctrines

We focus on two major classes of legal rules in our analysis: age of majority laws and mature minor doctrines.

Every state and major territory has its own age of majority law (hereafter AoM) lowering the age of majority from 21 to 18 years old. Table 1 gives the dates when each law came into force ("commenced"). Two states (New South Wales and South Australia) have separate minimum ages for medical consent that are comparable to AoM laws. For further discussion of the legal environment by state, see the Appendix A.

Most states and territories have a mature minor doctrine that is based on Gillick v West Norfolk and Wisbech Area Health Authority (1986) and the "Fraser Guidelines" developed in that case. The ruling from Gillick was approved in Australia on 6 May, 1992, in Secretary, Department of Health and Community Services v JWB and SMB (Marion's Case) (1992) 175 CLR 218, FC 92/010. The ruling states that "A minor is capable of giving informed consent when he/she achieves a sufficient understanding and intelligence to enable him/her to understand fully what is proposed". Interestingly, Gillick was a question of whether children under 16 could give consent, whereas no Australian state at the time had a law explicitly granting consent privileges to children aged 16 to 18 (although New South Wales already had a law that would have granted this power to most children over 14). The decision in Marion's Case also stipulated that a child (and also the parent) could *not* give consent for some treatments that were not medically necessary and had severe, long-term consequences for the child's wellbeing (e.g. sterilization

Table 1: Dates of age of majority laws and mature minor doctrines by state and territory (MM is "mature minor doctrine" and AoM is "age of majority of 18" unless otherwise specified)

State or territory	MM commenced	AoM Commenced	Separate AoM for medical consent
New South Wales	6 May 1992	*1 Jan 1971	*1 Jan 1971 (min. age: 14)
South Australia	**1 May 1987	15 Apr 1971	**1 May 1987 (min. age: 16)
Western Australia	6 May 1992	1 Nov 1972	
Tasmania	6 May 1992	1 Aug 1973	
Australian Capital Terr.	6 May 1992	1 Nov 1974	
Northern Territory	6 May 1992	1 Nov 1974	
Queensland	6 May 1992	1 Mar 1975	
Victoria	6 May 1992	1 Feb 1978	

**Minors (Property and Contracts) Act 1970*
***Consent to Medical and Dental Treatment Act 1985*

and gender reassignment), but these considerations are unlikely to be relevant if the main mechanisms through which these laws impact the outcomes of interest are oral contraceptives and abortion.

Gillick competence also grants a right of confidentiality to the minor. However, it is not clear that parents will not find out about a child's treatment because in most cases there is a record of treatment attached to the parent's Medicare account (MORE DETAILS AND CITATION).

2.2 Abortion

Until very recently abortion laws in Australia were ambiguous for decades in all but South Australia. Since 1969, South Australia has allowed abortions in cases where the risk of continuing the pregnancy was greater than the risk of not continuing the pregnancy.

For other states, the disambiguation also started in 1969. Most states have or had laws stating that "unlawful" abortions were crimes, but these laws did not specify which abortions were unlawful. A 1969 Victoria case *R v Davidson* led to the framework used in most states. The "Menhennitt ruling" in this case specified that abortion could be lawful if it were "necessary to preserve the woman from a serious danger to her life or her physical or mental health (not being merely the normal dangers of pregnancy and childbirth)" (Victorian Law Reform Commission, 2008). The ruling still implies great ambiguity, and we must look to medical history to know what impact it had on actual provision of abortion services. It is possible that physicians interpreted this as an indication that as long as they discussed the costs of pregnancy with patients that they were defended from prosecution. In NSW, whose courts adopted nearly identical rules in 1972 (*R v Wald*), a doctor was convicted of unlawful abortion in 2006 precisely because she did not discuss the possible costs of not terminating the pregnancy with the patient before the procedure. The implication was that if a physician made a decision about abortion after deliberation and discussion with the patient that the abortion would be lawful, and in this case the only reason a jury could claim that the termination was not justified was that there was evidence that the physician had not treated the case with sufficient concern. This implies de facto legal authority of physicians over whether to allow abortions.

Queensland has relied on the Victoria and New South Wales rules with a modification in 1986 stating that only medical concerns were valid in evaluating the lawfulness of abortion (*R v Bayliss and Cullen*). There have been no prosecutions for abortion since that ruling (Victorian Law Reform Commission,

2008).

Without knowing the details of actual medical practice, it is difficult to time the changes in abortion access costs that would be relevant for our analysis. For instance, did doctors in Queensland start to view termination as lawful in 1972 with the NSW ruling in *R v Wald*, or did they continue to see the legal environment as murky and risky until 1986? Did doctors in South Australia continue to fear for their careers and freedom after 1969 simply because the Menhennitt ruling did not explicitly state that they had the authority to make the decision about whether a termination was justified? We are still in the process of searching for evidence on medical practice, but a first approximation is to treat abortion as legalized in South Australia in 1969 and in other states in 1972. For further discussion of the legal environment by state, see the Appendix A.

3 Validity of youth consent as a natural experiment in Australia

There are two possible approaches to evaluating the exogeneity of the 1970s-era changes to youth consent laws. The second strategy is to simply argue that the source of the legal changes was something known to be plausibly orthogonal to the motivations of people in the state to get contraceptives. We start with the second and then present the evidence on correlation with observable pretreatment qualities of the states.

3.1 Age of majority changes as a result of the Vietnam War

The age of majority (hereafter AoM) changes started as a nationwide effort to lower the voting age. The Attorneys General of the various states and of the Commonwealth agreed that voting age laws would need to be uniform throughout the nation, and the issue was discussed at a conference of state Premiers and a conference of Attorneys General in 1968. The matter was subject to a great deal of discussion and cooperation between the national Attorney General and the governments of the individual states. The original recommendation for the lower voting age was from a committee in New South Wales in a report that was then considered by the Standing Committee of Commonwealth and State Attorneys-General, and it was agreed that all states would adopt the recommendations of the report if there was overall agreement to the terms of the report. The Canberra Times reported that the national Attorney General called the efforts "constructive federalism". The point we are making here is that the age of majority changes were products of one national-level motivation, whereas the differential timing of the laws might be due to bureaucratic issues.

The case for exogeneity of these legal changes is strengthened by the reasons for their adoption. As in the United States (see Bailey, 2006; Bailey, Guldi, Davido, et al., 2011; Bailey, Guldi, and Hershbein, 2013; Bailey, Hershbein, and Miller, 2012; Goldin and Katz, 2002), Australia participated in the war in Vietnam starting in the 1960s. Like the US, Australia conscripted soldiers to fight in Vietnam, and like in the US this led to intense public opposition.[1] As in the US, males over age 18 were eligible

[1] Prior to the Vietnam war, Australian conscription generally did not allow for drafted persons to be required to serve outside of Australian territory. For instance, the National Service Act 1951 states that, "A person is not liable to render service under this Act beyond the limits of Australia." The only exception was a minor case from WWII where conscripts were required to serve in the South-West Pacific in Dutch territories [CITE], but this was still viewed as defense of Australian territory because Japanese forces there were close to Australian territory [CITE]. The National Service Act 1964 (assented to on November 24, 1964) amended the National Service Act 1951–1957 to place conscripts into the Regular Army Supplement rather than the Citizen Military Forces (CMF) and to remove the restriction preventing conscripts from being sent outside of Australian territory. The restriction limiting the CMF to Australian territories remained in the Defense Act 1964, but conscripts would no longer be placed in that branch of the Military Forces, so this gave young men an opportunity to avoid being sent to Vietnam if they joined the CMF before being conscripted.

for conscription in Australia but were often ineligible to vote due to their age. The authors conducted a search of Australian newspapers throughout the 1960s and 1970s for results related to synonyms for "conscription" and "voting age". The articles came mostly from the Canberra Times and The Australian Women's Weekly but included some smaller publications. Debates about lowering the voting age and the age of majority often mentioned military service but never mentioned a desire by young women to obtain contraception or consent to medical treatment (although the right to consent to marriage was discussed). [More to come]

3.2 What are the characteristics of states that liberalized consent laws earliest?

[Coming soon]

4 Effect of youth consent on Pill uptake and abortion

In order to make the argument that consent law changes are a good proxy (or possibly instrument) for contraceptive choices in an analysis of contraceptives' effect on life outcomes, we need to show that these legal changes impact life outcomes primarily (or exclusively in the case of instruments) through their impact on contraceptive choices. A minimum standard of evidence is to show that consent law changes actually do impact contraceptive choices.

One important question that follows is *which* contraceptive choices we think that consent law impacts. Past researchers have focused mostly on oral contraceptives. The primary argument for this choice is that oral contraceptives generally require a prescription. Myers (2017), however, argues that much of the claimed effects of oral contraceptives can be attributed to abortion access. Although past work does attempt to control for abortion laws and practices, the validity of their methodology relies primarily on the reader's acceptance of the historical arguments for the exclusion restriction that consent law impacts the outcome variables only through Pill access—not based on estimates including abortion controls. The reasons are that consent law changes generally predated abortion law liberalization and that the arguments for abortion law exogeneity are weaker than the argument for consent law exogeneity. If consent law changes represent a pseudo-random assignment of only Pill access, then the methodology is sound even if they do not control for abortion laws. This methodology fails if increases in abortion access were coincident with consent law changes or if consent law changes increased access to abortion and the estimates did not properly control for abortion.

In this section of the paper, we attempt to provide additional evidence on the mechanisms by which consent laws affect life outcomes by estimating the effects of consent law changes on oral contraceptive and abortion use. Goldin and Katz, 2002 provided estimates of the effect of liberal state consent laws in the US on Pill use. Our estimates improve on theirs in two ways. First, the data we use observe Pill use patterns over an extended period of time for each individual. Second, Goldin and Katz, 2002 estimate only within-time-period variation in Pill use across states, whereas observing Pill use over an extended period allows us to use a difference-in-difference strategy that removes pre-treatment differences between states. We also show estimates based only on within-time-period for comparison.

The age requirements were different from previous conscription requirements. The 1951 Act allowed for males aged 18–26 (and 17-year-olds who voluntarily registered for conscription) to be called up for compulsory military service, whereas the 1964 Act limited the ages to 20–26. 20 was still below the age of majority and below the voting age in any state or territory.

The Defense Act 1903–1964…

4.1 Data

The Australian Family Project surveyed women aged 20 to 59 in 1986 and 1987 in Australia. The survey asked detailed questions about where each respondent had lived throughout their lives and which contraceptive methods they used. We observe many of these data with monthly precision, so we reconstruct a synthetic panel of individual lifetimes. With this panel, we observe in which state each person was living, whether she was using the Pill, and how old she was in each month of her life. The details of the panel construction are in the data appendix.

4.2 Pill use

Figure 1 shows our estimates of the proportion of women aged 18–20 in each state using the Pill in each month and the date on which the state lowered the age of majority from 21 to 18. Although the long-term upward trend in Pill use is clear from the plots, it is not clear whether there is evidence here of a post-AoM jump in Pill use.

We might suspect that the age of majority changes would particularly impact women who had not previously been married, so Figure 2 presents the same data but broken down into populations that had and had not been married at any time up to the given date. Pill use grew quickly for unmarried women in New South Wales after the age of majority change, but otherwise the patters are hard to interpret.

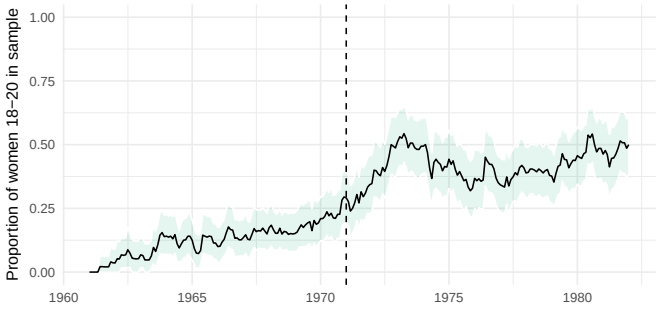
4.2.1 Regression evidence on concurrent Pill use

To further explore the effect of AoM on Pill use, we estimate a model of the choice by an individual to use or not use the pill in any given month as a function of the age of majority in her state during that month:

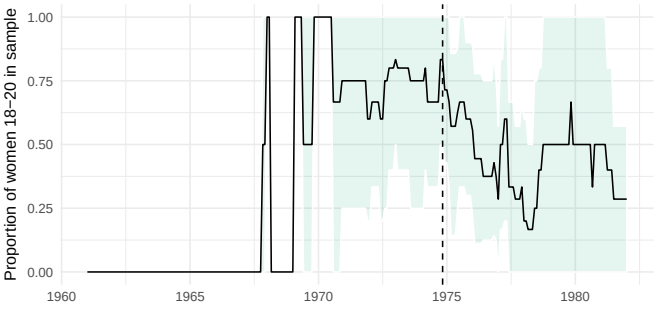
$$\begin{aligned}\text{Pill}_{it} = {} & \alpha \text{EffectiveLowerAoM}_{it} + \beta \text{LowerAoM}_{it} \\ & + \rho_1 \text{MarriedBefore}_{it} + \rho_2 \text{MarriedBefore}_{it} \times \text{EffectiveLowerAoM}_{it} \\ & + \gamma_1 \text{Pill}_{it-1} + \gamma_2 \text{UsedPillBefore}_{it} \\ & + \sum_s \delta_s D_{its} + \sum_t \delta_t D_{it} + \sum_a \delta_a D_{ita} + \varepsilon_{it} + \eta_{it} \quad (1)\end{aligned}$$

where

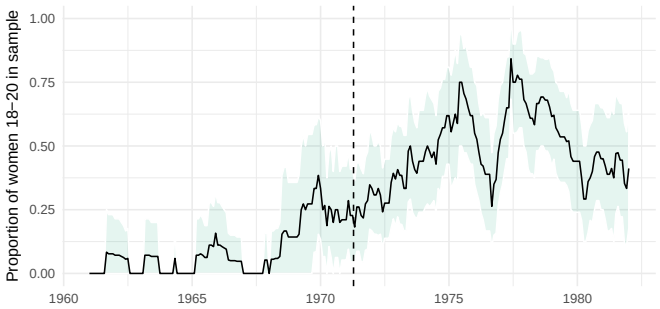
i	Indexes individuals
t	Indexes the time period (month)
s	Indexes state
Pill_{it}	1 if person i used the Pill at any time in time t
$\text{EffectiveLowerAoM}_{it}$	1 if the state in which person i lived at time t had lowered the age of majority to 18 from 21 by time t *and* the person is age 18–20 (our main treatment variable)
LowerAoM_{it}	1 if the state in which person i lived at time t had lowered the age of majority to 18 from 21 by time t
$\text{MarriedBefore}_{it}$	1 if person i had been married at any point before time t
$\text{UsedPillBefore}_{it}$	1 if person i had used the Pill in any month before time t
D_{its}	1 if person i lived in state s during time t
D_{it}	1 if this observation of person i was measured at time t
D_{ita}	1 if i was age a (in years) at time t
ε_{it}	a set of dummies for educational attainment



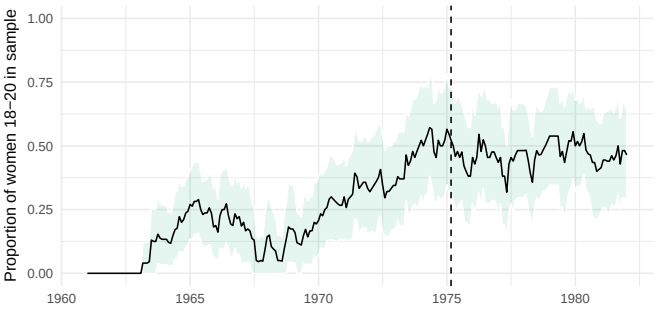
(a) New South Wales



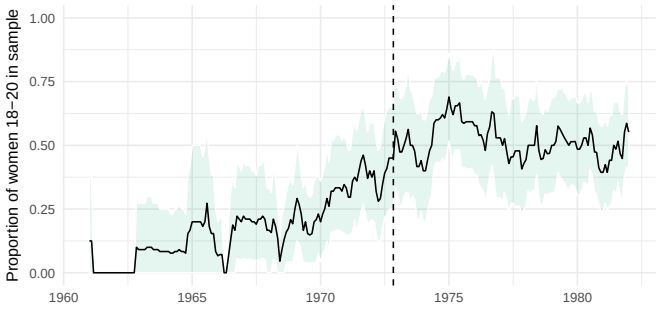
(e) Australian Capital Territory and Northern Territory



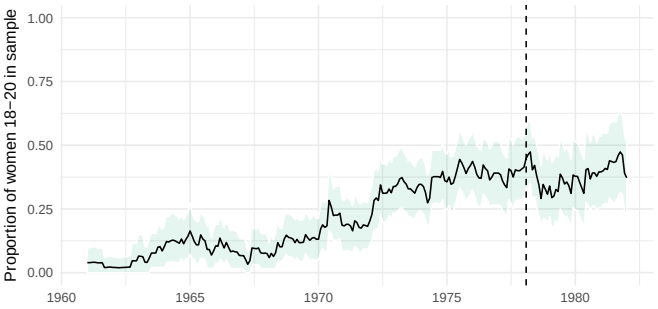
(b) S. Australia



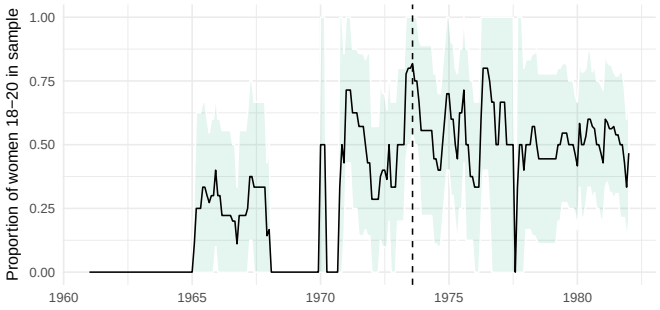
(f) Queensland



(c) W. Australia

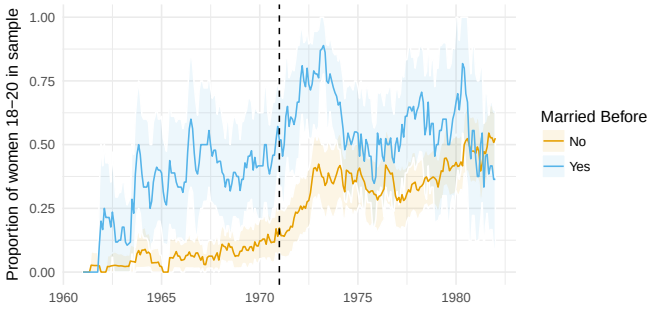


(g) Victoria

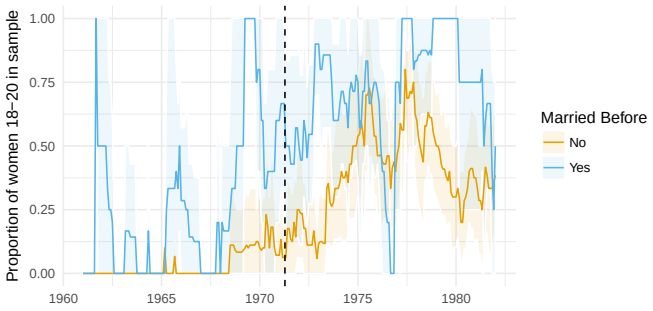


(d) Tasmania

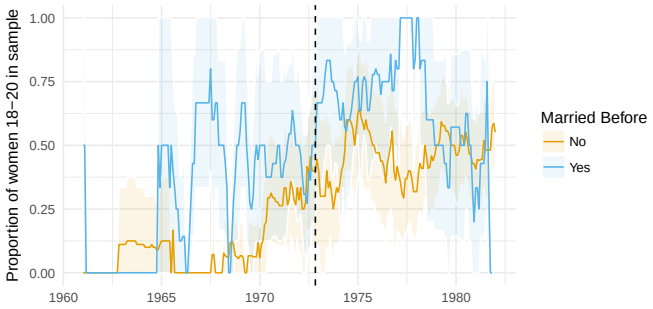
Figure 1: Proportion of women aged 18–20 in the Australian Family Project data using the Pill in each state during each month. The shaded region indicates 95% confidence intervals. Dashed lines show the date on which the age of majority in the state was lowered from 21 to 18.



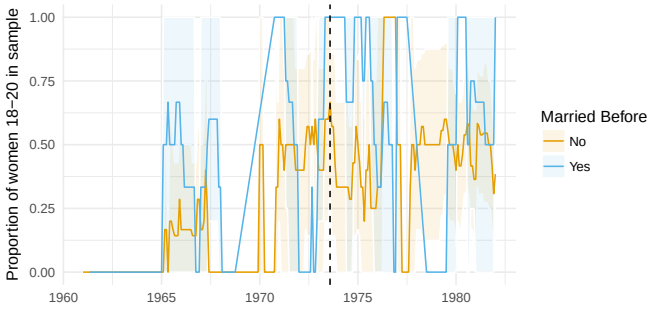
(a) New South Wales



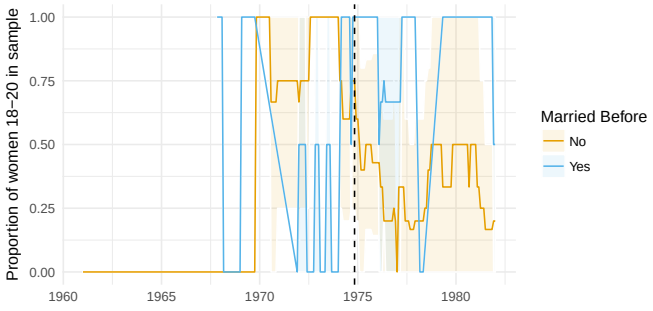
(b) S. Australia



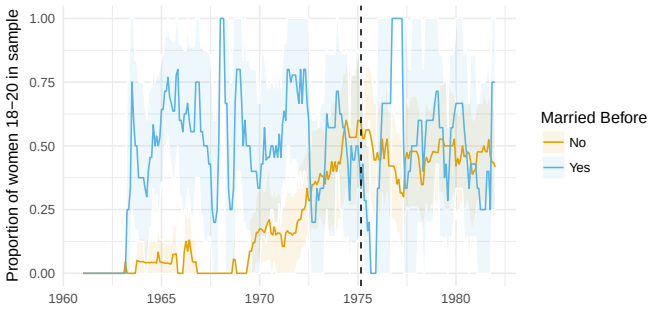
(c) W. Australia



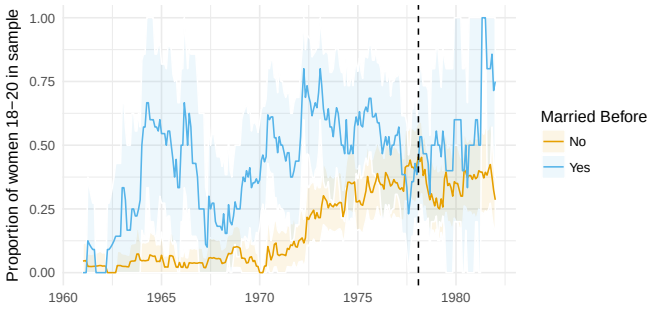
(d) Tasmania



(e) Australian Capital Territory and Northern Territory



(f) Queensland



(g) Victoria

Figure 2: Proportion of women aged 18–20 in the Australian Family Project data using the Pill in each state during each month by marriage condition. The shaded region indicates 95% confidence intervals. Dashed lines show the date on which the age of majority in the state was lowered from 21 to 18.

α is our coefficient of interest. We include indicators both for a lower age of majority and a lower age of majority combined with being age 18–20 in order to differentiate between generic effects of the lowered age of majority on a culture of youth from those effects that are directly due to increasing the legal autonomy of women aged 18–20. We estimate this model both with and without the indicator for marriage and the lagged pill use variables. The intuition behind the lagged Pill use variables is that oral contraceptives are most effective when taken consistently. These variables also capture some individual-level propensity toward Pill use. We emphasize, however, that much of the estimated marginal effect of these variables might be part of the effect of a lower age of majority, as we expect the lower age of majority to induce a choice to use the Pill over an extended period of time (precisely because that is when the Pill is useful). Thus, lagged Pill use is likely a proxy capturing many of the effects of past lower AoM treatment. We include these variables for transparency, but our main emphasis is on the cases without these variables.

We use data only on women from the Australian Family Project who were living in Australia during a given month of life.[2] Because no one in the sample uses the Pill before age 10, and no one uses the Pill after age 50, we limit the sample to this range. We assume that Pill use reported in any month in which a legal change occurs happens after the day of the legal change . Most of the laws commenced on the first of the month (the exception is that SA's AoM commenced on April 15), so this is probably a minor assumption. Our age in years variable is constructed by rounding down to whole number years—consistent both with how ages tend to be reported in Australia and with the way they are treated in law. For instance, the *Age of Majority Act 1977 (Vic)* states that "For all the purposes of the laws of the State the time at which a person attains a particular age expressed in years shall be the commencement of the relevant anniversary of the date of his birth."

Estimates of α, the effect of a lower age of majority on probability of Pill use during the month, are in Table 2. All regressions include a full set of state, birth year, and age (yearly) dummies. Column (1) suggests that being treated by a lower age of majority when 18–20 increases the probability of Pill use by around 20 percentage points. Column (2) shows that this effect is beyond any general effect of living in a state with a lower age of majority and applies specifically to people in the age range in question.

The coefficient estimate in the first row of column (4) in Table 2 looks small, but this is the contemporaneous effect of current laws on the choice to use the Pill today. There is also a cumulative effect that may be more informative. Imagine that a woman who has never used the Pill lives in a state that lowers its age of majority to 18 on her 18th birthday. That month, her probability of using the Pill is about 1 percentage point higher than it would have been without the legal change (assuming that one of the estimates of the effect is the actual population effect). If she does not move in the future, her probability of using the Pill in the next month is higher by 1 percentage point plus 0.967 times 1 percentage point because her increased probability of use in the first month increases her probability of use in the second month (assuming homogeneous effects of legal changes on Pill use). This means that she is 1.967 percentage points more likely to use the pill in the second month. This probability increase grows to 3 percentage points by the third month. After two years of continuously living in that state, her probability of Pill use is about 17 percentage points higher than it would have been without the legal change. Considering that the timing of age of majority changes spans seven years, this is not a small effect and helps explain how we get to the coefficients in the first row of the first two columns.

[2]Using the 1995 and 2001 Australian National Health Surveys, we could possibly estimate the effect of a lower age of majority on the probability that a woman used the Pill because the survey asks when the respondent first started taking oral contraceptives, but this question was only asked to women who were currently taking oral contraceptives, and that gives an impractically small sample of women who would have been 18–20 in the 1970s. Also, making inferences about the entire population of women based on these extremely truncated data would require strong assumptions about the distribution of the underlying data even if we had a large sample of women currently using the Pill who would have been 18–20 in the 1970s.

Table 2: OLS estimates of the effect of lowered age of majority on the probability of pill use

	Dependent variable:			
	Whether using the Pill			
	(1)	(2)	(3)	(4)
After lower AoM and age 18–20	0.204	0.207	0.186	0.010
	$(0.016)^{***}$	$(0.017)^{***}$	$(0.018)^{***}$	$(0.001)^{***}$
	$[0.012]^{***}$	$[0.012]^{***}$	$[0.013]^{***}$	$[0.001]^{***}$
	$\{0.020\}^{***}$	$\{0.017\}^{***}$	$\{0.013\}^{***}$	$\{0.001\}^{***}$
After lower AoM		−0.009	−0.009	−0.004
		(0.010)	(0.010)	$(0.000)^{***}$
		[0.011]	[0.011]	$[0.001]^{***}$
		{0.025}	{0.024}	$\{0.001\}^{***}$
Married Previously			0.083	−0.001
			$(0.013)^{***}$	(0.001)
			$[0.011]^{***}$	[0.001]
			$\{0.006\}^{***}$	{0.000}
Married, lower AoM, and 18–20			0.090	−0.005
			$(0.030)^{***}$	$(0.002)^{*}$
			$[0.025]^{***}$	$[0.003]^{*}$
			$\{0.028\}^{***}$	$\{0.002\}^{**}$
Used Pill Before				0.006
				$(0.000)^{***}$
				$[0.000]^{***}$
				$\{0.000\}^{***}$
Used Pill Last Month				0.967
				$(0.001)^{***}$
				$[0.001]^{***}$
				$\{0.001\}^{***}$
Persons	2,545	2,545	2,545	2,545
Person×Month Obs	755,856	755,856	755,856	755,856

Notes: All regressions include state, birth year, age, and educational attainment dummies
Using probit estimates produces no substantial changes
( ): SEs allowing for error correlation at state × birth year level
{}: SEs allowing for error correlation at state × current year level
[ ]: SEs allowing for error correlation at state level
*p<0.1; **p<0.05; ***p<0.01

Column (3) of Table 2 suggests that the effect of a lower age of majority was smaller for *un*married women than for married women. This is a bit surprising, but column (4) reveals that this pattern is reversed when we condition on previous Pill use. If marriage makes it lower cost to access the Pill (consistent with the coefficient on "Married Previously" in column (3)), then being married at some point before the current date means that the woman is more likely to have started using the Pill. Perhaps the story would be different if we were looking at the effect of a lower age of majority on the probability of starting the Pill, which is where we turn next.

Table 2 shows a great deal of persistence of Pill use over time. The proportion of women using the Pill in the previous month who go on to use it in the next month is 97 percentage points higher than the same proportion for women not using the Pill in the previous month. This should be expected both because the Pill is most effective when taken consistently over an extended period [CITE] and because the Pill use data were not collected by asking, "Were you using the Pill in this particular month?" (and so on). Rather, the respondent was asked when she started using the Pill, when she stopped, when she started again, when she stopped that time, and so on. The synthetic panel was constructed from these reported spells of Pill use, and it is possible that someone who simply failed to take the Pill as prescribed for a month would still include that month in a spell spanning that month rather than reporting that they stopped that month and then started again the next month. This time persistence suggests that we might be interested in what causes women to first *start* using the Pill.

4.2.2 Regression evidence on Pill uptake

For this purpose, we estimate a hazard model where the time-to-event is a woman's age when she first uses the Pill. There are two main explanatory variables we might wish to consider in this model. We could follow Goldin and Katz (2002), Bailey (2006), and others and use the consent laws that were in place when the woman turned 18 in either her state of birth or her state of residence at age 18. They used this treatment variable because they did not observe where the woman lived throughout her life, but this variable also has the benefit of being exogenous to the woman's choices as an adult. The treatment variable we use instead is the state of residence that is contemporaneous with the choice to start using the Pill (or the state of residence right before the choice to start using the Pill). At each moment in time in our model, a woman who has not yet used the Pill observes the laws in her current state and then chooses whether to start using the Pill. In practical terms, we observe this choice in discrete chunks of time (months or years).

We specify a proportional hazard model:

$$\ln \theta_{it} = \ln \theta_{i0} + \alpha \text{LowerAoM}_{it} + \sum_s \delta_s D_{s,it} + \sum_t \delta_t D_{t,it} + \eta_{it} \tag{2}$$

where θ_{i0} is the baseline hazard for person i. Using Cox's partial likelihood estimation procedure (Cox, 1972), we do not need to specify θ_{i0} in order to estimate α, the proportional increase in the hazard due to being in a state with a lower AoM.

We estimate this model on the set of person×month observations in the synthetic panel of women aged 18–20 (inclusive) living in Australia in the Australian Family Project data who have not used the Pill in the past. We also limit the sample to women born between 1944 and 1968 because this is the largest birth year window within which every birth year has at least one woman who uses the Pill at some point. We look at Pill uptake only before 1986.

Table 3 presents estimates of the proportional marginal effect of a lower AoM on the hazard, showing little (if any) evidence of an effect. Although we still need to make some adjustments to the standard error estimates to account for error correlation between month observations for the same woman, these adjustments will likely increase the standard errors.

Table 3: MLE estimates of the effect of lowered age of majority on the probability of pill uptake in a Cox proportional hazard model

	Dependent variable:			
	Log hazard of starting first Pill use for women aged 18-20			
	(1)	(2)	(3)	(4)
Lower AoM	0.211	0.093	0.195	0.071
	(0.133)	(0.163)	(0.134)	(0.165)
Time FEs	Birth Year	Birth Year	Current Year	Current Year
State FEs	No	Yes	No	Yes
Observations	34,470	34,470	34,470	34,470
Note:				*p<0.1; **p<0.05; ***p<0.01

We now return to the question of the role of marriage in the choice to use the Pill. Here we think of marriage as a competing risk: women who were not married by age 18 look at their state's age of majority during every month when they are age 18–20 and decide whether to use the Pill or get married. We suggest that much of the decision about one or the other outcome depends on unobserved individual heterogeneity. [Coming soon]

4.2.3 Replication of Goldin and Katz (2002) with the Australian Family Project data

For comparison, we produce estimates similar to ones by Goldin and Katz, 2002 by using only within-cohort variation in Pill use across states (rather than the difference-in-difference variation like we exploit above). In their Table 3, they presented estimates of the effect of more liberal consent laws on Pill use at any time up to the date when the sample was taken. They estimated a 4.2 percentage point increase in Pill use from being in a state with a nonrestrictive consent law for minors. We do this by selecting a month from within the range when Australian states were changing their consent laws and calculating statistics from the information that would have been available from a survey performed at that time that asked questions similar to those in the National Survey of Young Women, 1971 (the data used by Goldin and Katz (2002)). We regress an indicator for whether an individual had used the Pill at any point up to and including that month on an indicator whether her current state of residence had lowered the age of majority from 21 to 18 by that month (along with controls for age in years and Catholic upbringing). We do this for a range of months from 1972 to 1977 and plot the coefficients on lowered age of majority in Figures 3 and 4. Figure 3 shows the effect for 18–20-year-olds, the age group that age-of-majority laws should most affect, and 4 shows estimates for 17–19-year-olds because that was an age group used by Goldin and Katz (2002). Our estimates indicate a much larger effect of age of majority laws on Pill use in Australia than they estimated for a similar time period in the US. The estimates are also slightly lower than our estimates based on difference-in-difference variation in Table 2. We admit that this result surprised the authors. We would assume that if pre-AoM conditions were correlated with the timing of AoM that the states that lowered their AoM earliest would be the ones with high Pill use due to a culture of youth and liberality in those states. This would suggest that not controlling for the pre-AoM differences in Pill use would induce positive bias in the estimator of AoM's effect on Pill use. But here we see that not controlling for pre-AoM conditions (as in Figures 3 and 4) gives lower estimates than we get when

controlling for pre-AoM conditions (as in Table 2). Perhaps (and this is just author speculation) the states that lowered their AoM earlier were doing so to respond to higher barriers to youth decision-making.

4.3 Abortion use

Although the Australian Family Project survey does not ask explicitly about abortion, it does give us data on pregnancies and whether those pregnancies end in a live birth. As long as state-specific changes in abortion rates were not coincident with other changes to factors that would affect whether a pregnancy ends in a live birth, we can interpret changes in the rate at which pregnancies do not lead to birth as changes in abortion rates. This should be understood with the additional condition that we employ difference-in-difference variation in these rates. [Coming soon]

5 Methods for estimating effects of AoM on life outcomes

We now turn to estimating the effect of youth consent on other life outcomes. Following Bailey, Hershbein, and Miller (2012) with some modifications, we estimate

$$Y_{iacts} = \sum_g \beta_g AoM_{cs} D_{g(a)} + \sum_g \lambda_g D_{g(a)} + \sum_s \lambda_s D_{is} + \sum_c \lambda_c D_{ic} + \sum_t \lambda_t D_{it} + \eta_{iacts} \tag{3}$$

where

i	Indexes individuals
a	Indexes 5-year age groups
c	Indexes year of birth (in 5-year groups)
t	Indexes sample year
s	Indexes state
Y	Wage or other outcome
AoM_{acs}	1 if people aged a born in year c living in state s were subject to an AoM of 18 or a mature minor doctrine at age 18
$D_{g(a)}$	1 if person i is in age group g (in 5-year groups)
D_{is}	1 if person i lived in state s at the time of the sample (or 5 years earlier in some specifications)
D_{ic}	1 if person i was born in year c
D_{iy}	1 if person i was measured in year y

Goldin and Katz (2002) estimated models restricting the age-specific coefficients to be equal across age groups, and we will similarly leave out age groups when estimating age at first marriage, completed fertility, and educational attainment. Unlike Bailey, Hershbein, and Miller (2012), we use sample year fixed effects instead of birth year fixed effects. Because we observe only the sample year and an age group for the individual in that year, we cannot be very precise about birth years, so it is simply easier to report results with sample year rather than assigning a birth year and making readers keep in mind that this actually implies a five-year interval.

We also evaluate the effect of pill *use* on incomes by instrumenting for use with legal access. This has been difficult with previous research on the US (for instance, Bailey, Hershbein, and Miller (2012) use the 1970 National Fertility Survey to look at the effect of AoM on Pill use among women aged 17 to 21 in the 1960s who were also married by 1970 and observe changes in AoM for only five states over that period), and for Australia it is only possible using two years of the National Health Survey (1995 and 2001). Even then (because of the structure of the survey) we can only see the effect of early pill use among women currently using the pill. We observe whether a woman in the sample was using the Pill at

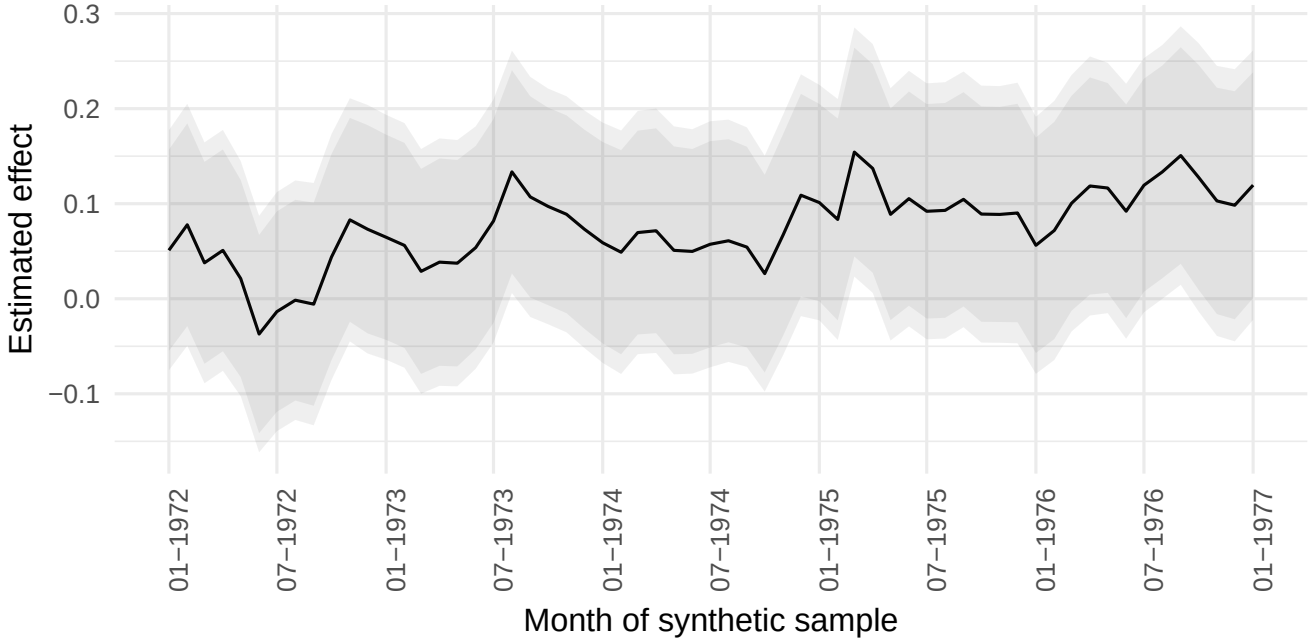


Figure 3: Replication of Goldin and Katz, 2002 Table 3 with age 18–20. Estimates of the marginal effect of being in a state with a lower age of majority on the probability of having used the Pill for the sample of women aged 18–20 (inclusive) in the Australian Family Project in the indicated month. The lighter shaded region indicates 95% confidence intervals, and the darker shaded region indicates 90% confidence intervals. All regressions include controls for year of age and Catholic upbringing. As in Goldin and Katz, 2002, the results are not substantively different with probit or logit estimates. Sample sizes are all over 200.

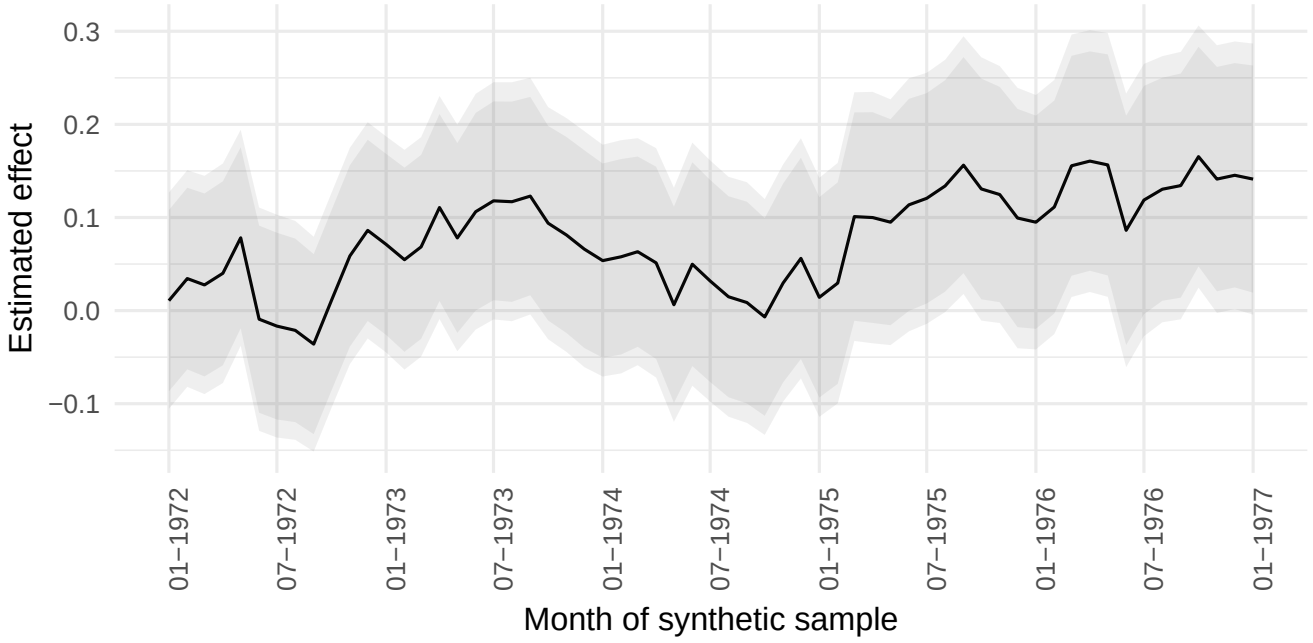


Figure 4: Replication of Goldin and Katz (2002) Table 3 with age 17–19. Estimates of the marginal effect of being in a state with a lower age of majority on the probability of having used the Pill for the sample of women aged 17–19 (inclusive) in the Australian Family Project in the indicated month. The lighter shaded region indicates 95% confidence intervals, and the darker shaded region indicates 90% confidence intervals. All regressions include controls for year of age and Catholic upbringing. As in Goldin and Katz, 2002, the results are not substantively different with probit or logit estimates. Sample sizes are all over 200.

the time of the survey, and for those who were using the Pill, we also observe whether they first used it by age 20. Like Bailey, Hershbein, and Miller (2012), we caution the reader against taking our estimates of the effect of AoM on pill use as good estimates of the first stage. However, it may be instructive to at least look at the estimates.

6 Data for estimating effects of AoM on life outcomes

The data are repeated cross section samples of the Australian population. We use the 1986, 1991, 1996, 2001, and 2006 Australian Census of Population and Housing. These include person-level information on state of residence (and state of residence five years earlier in the 1996, 2001, and 2006 samples), age (in five-year groups), usual personal income per week, labor force status and hours worked in the previous week, education level, marital status (the 1986 Census also includes data on age at first marriage and year first married), occupation and industry, and number of children.

Because ages are in five-year bins, we calculate a probability of treatment with an age of majority of 18 instead of 21 (AoM). If a person's age group implies that she was no older than 18 at the time when her state's laws changed to allow 18-year-olds to consent to medical treatment, she gets a 1 for the AoM variable. If a person's age group implies that she was no younger than 19 at the time when her state's laws changed to allow 18-year-olds to consent to medical treatment, she gets a 0 for the AoM variable. Women whose age group includes both people who would have had AoM and people who would not have had AoM receive a value for AoM equal to the proportion of ages in the group that would have been treated. Table 4 shows the dates of the census nights and examples of how we encode the AoM variable. For example, if a woman's age is 30–34 on Census night in 1991 (August 13), then she turned 18 between late 1974 and early 1979. If she lived in Queensland, which changed its law on 1 Mar, 1975, then she has 1627 days when she could have turned 18 after the legal change and 1826 total potential 18th birthdays.[3] Thus we would assign a value of 1627/1826 (or about .9) for the AoM variable. The exact coding depends on the exact date when the legal change commenced compared to the date of census night and is available from the authors.

Table 4: Dates of census nights and example AoM treatment variable construction

		AoM treatment probability						
Census night	18th birthday for someone age 30–34	NSW	SA	WA	Tas	ACT/NT	Qld	Vic
1986: Aug 12	Aug 13, 1969 – Aug 12, 1974	$\frac{1320}{1826}$	$\frac{1216}{1826}$	$\frac{650}{1826}$	$\frac{377}{1826}$	0	0	0
1991: Aug 13	Aug 14, 1974 – Aug 13, 1979	1	1	1	1	$\frac{1747}{1826}$	$\frac{1627}{1826}$	$\frac{559}{1826}$
1996: Aug 13	Aug 14, 1979 – Aug 13, 1984	1	1	1	1	1	1	1
2001: Aug 14	Aug 15, 1984 – Aug 14, 1989	1	1	1	1	1	1	1
2006: Aug 15	Aug 16, 1989 – Aug 15, 1994	1	1	1	1	1	1	1

In 1986 and 1991, **hours worked** are reported for the previous week (the week before Census night) and only for the main job. The **income** data for all years are for the preceding week, but the 1986 and 1991 Censuses tabulated them to yearly equivalents before distribution (Castles, 1986). For these two

[3]For simplicity, we ignore the possibility of a February 29 birthday. We welcome any attempts to justify the notion that this is a problem, but every five-year span of possible 18th birthdays that gives partial treatment in our data has exactly 1826 days. If some state had changed its law in 1980, we would have to contend with an extra day for people whose treatment was ambiguous in that period.

years, we divide the incomes by 52 to retrieve an analog for the measures from other years. The income data are in bins, and we replace these categories with the median value from each bin except the top bin or any bin that includes negative values. We assign an income of zero to any person whose income is in a bin with negative values. We assign 150% of the lower bound of the top bin to anyone in that group. We deflate wages by the all groups CPI with 1986 as the base year.

In 1996, 2001, 2006, we use the usual **state of residence** five years before census night to estimate treatment with early access. In 1986 and 1991, we use the state of current residence. The time when we observe residency is clearly a long way from the time when some people in the sample were 18-years-old (and when age of majority laws changed). We should expect that this will attenuate estimates of effects of early access.

For all years except 1991, we combine the Australian Capital Territory and the Northern Territory because the 1986 Census reports combined values for these territories. This is not problematic because their legal changes were coincident. Although we could identify residence in ACT and NT separately in 2001 and 2006, we leave them combined both for continuity with previous years and because each age group cell in the NT sample would have fewer than 30 women. In 1991, the Census combined ACT with Tasmania, and NT was combined with remote areas of SA and WA, and those groups do not share timing of legal changes, so we omit NT, ACT, and Tasmania in 1991.

We also use the 1977–78, 1995, and 2001 National Health Surveys to look at birth control uptake. The 1977–78 survey asks if respondents were prescribed or took oral contraceptives in the last week. This is not a long time-period, so this is likely a very noisy measure of oral contraceptive use. In 1995 and 2001, women were asked if they were currently using the Pill. Those who gave an affirmative answer were then asked at what age they first used the Pill.

7 Results: life-cycle incomes

Table 5 gives estimates of Equation 2 without abortion controls for three different populations with hourly wage as the dependent variable. Early access to contraceptives seems to push down wages for women early in their lives and increase those wages later in their lives (relative to the wages they would have without access). This is consistent with the intuition that women with more certainty about their fertility outcomes invest more intensively and extensively in human capital that will support higher-earning careers, and those investments will require foregone wages early in life but pay off later.

The estimates are close to but lower than those from Bailey, Hershbein, and Miller, 2012. We should expect some attenuation of the marginal effects because of measurement error in state of residence at age 18. Although we would like to know where each person lived when they were age 18-21, we only observe where the person lived years later and when they first lived in Australia. While it is possible that AoM led to an environment that was desirable to high earners (inducing an upward bias in the estimates), it seems likely that migration between states would dissipate the observed effect of early legal access as people who were treated move into other states where they would not have been treated and people who were not treated move into states where they would have been treated had they been there at age 18. For a comparison with Figure 3B in Bailey, Hershbein, and Miller, 2012, we plot the marginal effects of AoM on incomes in Figure 5. However, the reader should be aware that our age groups start at 25–29 while their youngest age group was 20–24.

Table 5 reported results for all women with positive incomes. We also report estimates for women who are full-time workers (defined as working 35 to 55 hours per week) with positive incomes in Table 6. The trends are similar (but less smooth). Early legal access appears to increase incomes less among full-time workers, and this is what we would expect if AoM increases labor force participation for women

Table 5: Estimates of age-specific proportional increase in income due to pill access (all workers)

	Dependent variable:		
	log of hourly wage		
	(1)	(2)	(3)
ELA for age 25–29	−0.101	−0.085	−0.080
	(0.027)***	(0.025)***	(0.024)***
	[0.025]***	[0.032]***	[0.030]***
ELA for age 30–34	−0.008	0.006	0.005
	(0.025)	(0.023)	(0.024)
	[0.022]	[0.016]	[0.020]
ELA for age 35–39	0.055	0.042	0.037
	(0.029)*	(0.024)*	(0.026)
	[0.026]**	[0.018]**	[0.024]
ELA for age 40–44	0.058	0.042	0.036
	(0.027)**	(0.021)**	(0.021)*
	[0.018]***	[0.018]**	[0.023]
ELA for age 45–49	0.051	0.066	0.055
	(0.027)*	(0.018)***	(0.019)***
	[0.026]*	[0.017]***	[0.023]**
ELA for age 50–54	0.049	0.094	0.087
	(0.031)	(0.020)***	(0.020)***
	[0.021]**	[0.017]***	[0.016]***
FEs	a,c,s	a,y,s	a,c,y,s
Employment population	All women with non-negative income		
Observations	48642	48642	48642

Notes: *p<0.1; **p<0.05; ***p<0.01

( ): SEs accounting for correlation at State × Age × Sample year level

[ ]: SEs accounting for correlation at State level

Indicators for fixed effects are as defined for Equation 3

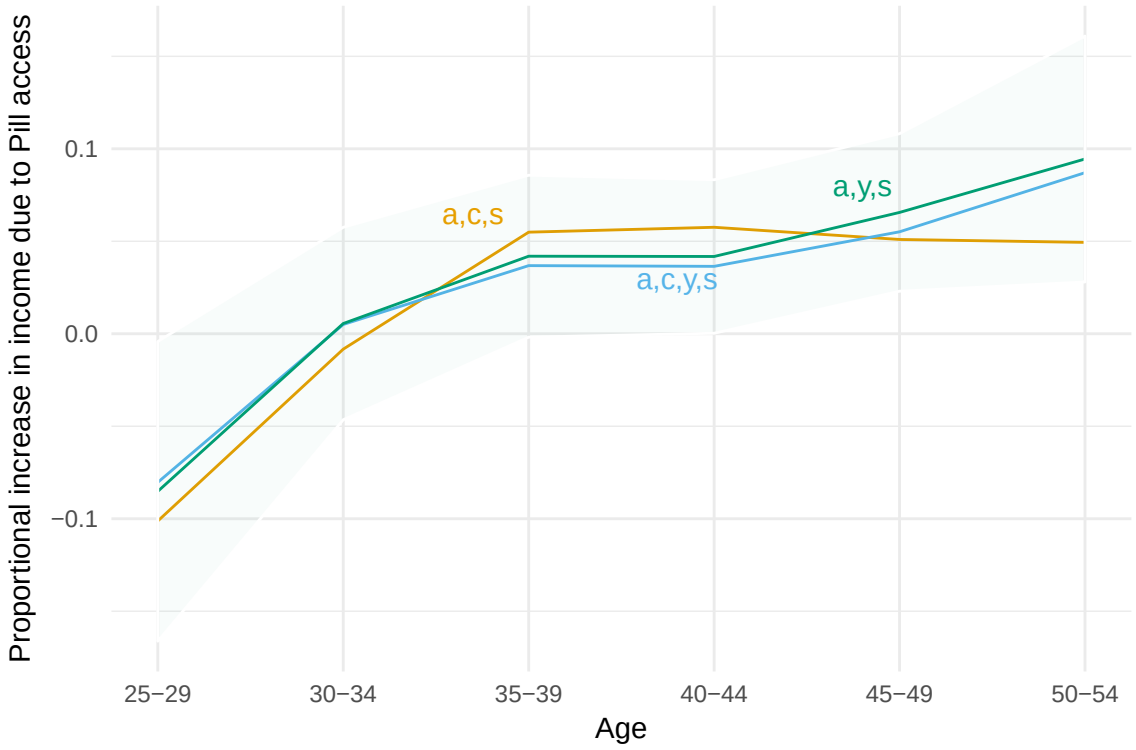


Figure 5: Estimates of age-specific proportional increase in income due to pill access (all workers). Labels indicate included fixed effects (as defined for Equation 3). The shaded region indicates 95% confidence intervals for the column 2 (a, y, s fixed effects) coefficients.

at the margin. Section 8 evaluates this effect.

8 Results: labor supply

We expect that AoM encourages women to invest in work-related human capital. This increased human capital would increase the benefits and decrease the costs of working later in life. Thus we expect that women treated with AoM would be more likely to work and, conditional on working at all, would work more from middle age on. However, we must also consider income effects and demand shifts. Particularly, we might think that women with AoM would have higher-earning spouses and partners, which would increase their demand for leisure. There are two main mechanisms for this increase: women with higher earning potential and human capital might match with partners with higher earning potential, and women with AoM might increase work early in their lives to support partners who are investing in human capital that will pay off later. However, we estimate that AoM is negatively correlated with labor supply at the intensive margin. We apologize for not including this table yet.

9 Results: educational attainment

We might suppose that one of the ways pill access would induce higher wages is by decreasing the cost of schooling attainment. Table 8 reports linear probability model estimates for the probability that a woman received a bachelor degree (or higher) and also for the probability that the woman received any tertiary

Table 6: Estimates of age-specific proportional increase in income due to pill access (full time)

	Dependent variable:		
	log of hourly wage		
	(1)	(2)	(3)
ELA for age 25–29	−0.102	−0.108	−0.101
	(0.035)***	(0.041)***	(0.039)***
	[0.028]***	[0.055]**	[0.048]**
ELA for age 30–34	0.013	0.015	0.022
	(0.051)	(0.050)	(0.050)
	[0.056]	[0.063]	[0.058]
ELA for age 35–39	0.044	0.035	0.029
	(0.036)	(0.036)	(0.036)
	[0.032]	[0.040]	[0.035]
ELA for age 40–44	0.048	0.040	0.035
	(0.034)	(0.032)	(0.033)
	[0.021]**	[0.022]*	[0.023]
ELA for age 45–49	0.046	0.061	0.047
	(0.032)	(0.028)**	(0.028)*
	[0.023]*	[0.012]***	[0.024]*
ELA for age 50–54	0.018	0.073	0.054
	(0.037)	(0.026)***	(0.027)**
	[0.018]	[0.023]***	[0.017]***
FEs	a,c,s	a,y,s	a,c,y,s
Employment population	Full time	Full time	Full time
Observations	48642	48642	48642

Notes: *p<0.1; **p<0.05; ***p<0.01

( ): SEs accounting for correlation at State × Age × Sample year level

[ ]: SEs accounting for correlation at State level

Indicators for fixed effects are as defined for Equation 3

Table 7: Estimates of age-specific proportional increase in income due to pill access (all college-educated workers)

	Dependent variable:		
	log of hourly wage		
	(1)	(2)	(3)
ELA for age 25–29	−0.318	−0.220	−0.219
	(0.048)***	(0.039)***	(0.041)***
	[0.031]***	[0.034]***	[0.040]***
ELA for age 30–34	−0.178	−0.067	−0.075
	(0.059)***	(0.044)	(0.049)
	[0.040]***	[0.042]	[0.045]
ELA for age 35–39	−0.034	−0.012	−0.017
	(0.049)	(0.045)	(0.045)
	[0.040]	[0.032]	[0.024]
ELA for age 40–44	0.068	0.028	0.023
	(0.041)*	(0.033)	(0.032)
	[0.018]***	[0.024]	[0.021]
ELA for age 45–49	0.063	0.033	0.028
	(0.047)	(0.042)	(0.041)
	[0.036]*	[0.042]	[0.037]
ELA for age 50–54	0.075	0.076	0.081
	(0.061)	(0.059)	(0.051)
	[0.044]*	[0.067]	[0.050]
FEs	a,c,s	a,y,s	a,c,y,s
Employment population	All women with non-negative income		
Observations	48642	48642	48642

Notes: *p<0.1; **p<0.05; ***p<0.01

( ): SEs accounting for correlation at State × Age × Sample year level

[ ]: SEs accounting for correlation at State level

Indicators for fixed effects are as defined for Equation 3

certification.[4] We again include state and sample year fixed effects, but we do not estimate separate effects of AoM for each age group because college education (at least at the bachelor level) should be completed for almost everyone in the age groups we observe.[5]

The effect of a lower AoM on tertiary education is large in each specification, with an overall 1.2 percentage point increase in the probability of getting a bachelor degree (from a base of 14%). This is substantially larger than estimates of .78 percentage points for the US by Hock (2007), but we did not include here controls for abortion laws because we are not able to separately identify abortion and contraceptive access. The effect for any certification is larger than the effect for bachelor degrees. This might make us suspect that the largest delays in fertility would be seen in early adulthood (because most certificates takes less time than a bachelor degree).

Table 9 shows the same estimates for men. The effect on college graduation is larger for men than for women, whereas the effect on receiving and certification is smaller for men than for women.

10 Results: age at first marriage

In this section, we extend work by Goldin and Katz, 2002 on the effect of pill access on age at first marriage to Australia. However, we caution the reader that "marriage" may not be a stable concept between nations. For instance, "de facto" marriages are much more common in Australia than in the US. It is not clear a priori that delayed marriage itself should be a result of pill access. AoM should increase marriage age if

- married women in Australia were able to get contraceptives more easily than unmarried women (an incentive for marriage) and AoM reduced this difference for most women (e.g. if much of women's sexual activity outside of marriage would have been after age 18 and before age 21),
- there were significant costs of out-of-wedlock birth, or
- marriage was a response to desired fertility.

As seen in Table 10, we find no evidence of a change in marriage age due to Pill access for the full sample of women in the 1986 Census with non-negative income or for subsets of this group with college degrees.

11 Results: completed fertility

12 Joint determination of outcome variables

We believe that the outcome variables interact in complicated ways. For instance, AoM likely impacts wages partially by determining college enrollment and graduation. Perhaps Pill access changes the composition of education groups, pushing more people into higher education, and perhaps those people have lower earning potential than the people who would have been willing to bear the cost of reduced sexual activity or high fertility uncertainty to pursue higher education without Pill access. Perhaps wages for

[4] We use a linear probability model because the dependent and independent variables are all binary. Using probit estimates produces no substantial changes.

[5] We could include younger cohorts, but the further away in time a cohort is past the treatment cutoff the worse of a counterfactual it provides to untreated cohorts.

college-educated women in Australia have little variation so that an additional year of investment in education at the graduate level has a much smaller impact on wages than an additional year of investment in education at a certificate level; if Pill access led all groups of people to spend one more year in school, the impact on wages for the lower education groups would then be higher. Note that an instrumental variables approach would identify the LATE of college education but would not be sufficient here to recover the strength of the effect of AoM on incomes that operates through the college education mechanism. We will need structural equation modeling for this purpose

On the other hand, within the population of women with a high propensity to go to and graduate from college, AoM may have a different impact on wages than among those women with a low propensity for college education even if we define those groups so narrowly that almost no woman within either group would be pushed into or out of college by AoM. For instance, it could be that students have less sex so that the potential income gains from low costs of contraception are lower for them.

In this section, we present estimates of a system of simultaneous equations determining the outcomes of interest.

[Coming soon]

Table 8: Linear probability model estimates of the effect of pill access on educational attainment (women)

	Dependent variable:	
	Bachelor or higher	Any certification
	(1)	(2)
All women		
Proportion with the specified degree	0.138	0.339
Marginal effect of ELA	0.012	0.031
SEs clustered at state × cohort	(0.006)**	(0.007)***
SEs clustered at state	(0.006)*	(0.006)***
Observations	80,001	80,001
Full-time only		
Proportion with the specified degree	0.203	0.426
Marginal effect of ELA	0.016	0.026
SEs clustered at state × cohort	(0.008)*	(0.014)*
SEs clustered at state	(0.01)	(0.006)***
Observations	26,823	26,823

Notes: *p<0.1; **p<0.05; ***p<0.01
Using probit estimates produces no substantial changes
All regressions include state and cohort fixed effects

Table 9: Linear probability model estimates of the effect of pill access on educational attainment (men)

	Dependent variable:	
	Bachelor or higher	Any certification
	(1)	(2)
All men		
Proportion with the specified degree	0.142	0.497
Marginal effect of ELA	0.021	0.002
SEs clustered at state × cohort	(0.007)***	(0.006)
SEs clustered at state	(0.003)***	(0.007)
Observations	77,722	77,722
Full-time only		
Proportion with the specified degree	0.161	0.542
Marginal effect of ELA	0.031	0.015
SEs clustered at state × cohort	(0.007)***	(0.007)**
SEs clustered at state	(0.002)***	(0.009)
Observations	56,578	56,578

Notes: *p<0.1; **p<0.05; ***p<0.01
Using probit estimates produces no substantial changes
All regressions include state and cohort fixed effects

Table 10: OLS estimates of the probability of marriage by age 23 among women aged 30-39 in 1986

	Dependent variable:		
	Married by age 23		
	(1)	(2)	(3)
ELA	0.019	0.017	−0.049
	(0.015)	(0.028)	(0.071)
	[0.017]	[0.036]	[0.085]
FEs	c,s	c,s	c,s
Education population	All	Any certificate	Bachelor or higher
Employment population	All women in 1986 with non-negative income		
Observations	13781	4227	1050

Notes: *p<0.1; **p<0.05; ***p<0.01
( ): SEs accounting for correlation at State × Birth year level
[ ]: SEs accounting for correlation at State level
Indicators for fixed effects are as defined for Equation 3

A Appendix: history of medical consent for youths by state

A.1 Mature minor doctrines

A.1.1 Nationwide in 1992: Gillick competence

Most states and territories have a mature minor doctrine that is based on Gillick v West Norfolk and Wisbech Area Health Authority (1986) and the "Fraser Guidelines" developed in that case. The ruling from Gillick was approved in Australia on 6 May, 1992, in Secretary, Department of Health and Community Services v JWB and SMB (Marion's Case) (1992) 175 CLR 218, FC 92/010. The ruling states that "A minor is capable of giving informed consent when he/she achieves a sufficient understanding and intelligence to enable him/her to understand fully what is proposed". Interestingly Gillick was a question of whether children under 16 could give consent, whereas no Australian state at the time had a law explicitly granting consent privileges to children aged 16 to 18 (although New South Wales already had a law that would have granted this power to most children over 14). The decision in Marion's Case also stipulated that a child (and also the parent) could textitnot give consent for some treatments that were not medically necessary and had severe, long-term consequences for the child's wellbeing (e.g. sterilization and gender reassignment), but these considerations are unlikely to be relevant in the case of oral contraceptives or abortion.

Gillick competence also grants a right of confidentiality to the minor. However, it is not clear that parents will not find out about a child's treatment because in most cases there is a record of treatment attached to the parent's Medicare account (MORE DETAILS AND CITATION).

A.1.2 South Australia in 1985

South Australia had a mature minor doctrine in place before other states. The *Consent to Medical and Dental Treatment Act 1985 (SA)* 1985 (commenced 1 May 1987: Gaz. 30 April 1987, p. 1115) specified that

6. 6.

   (a) 1. The consent or the refusal or absence of consent of a minor who is of or above the age of sixteen years in respect of a medical procedure or dental procedure to be carried out on the minor or any other person has the same effect for all purposes as if the minor were of full age.

   (b) 2. The consent of a minor who is less than sixteen years of age in respect of a medical procedure or dental procedure to be carried out on the minor has the same effect for all purposes as if the minor were of full age where, in the opinion of a medical practitioner or a dentist supported by the written opinion of one other medical practitioner or dentist, as the case may be—

      i. a. the minor is capable of understanding the nature and consequences of the procedure; and

      ii. b. the procedure is in the best interests of the health and well-being of the minor.

The *Consent to Medical Treatment and Palliative Care Act 1995 (SA)* 1995 updated these rules:

12. 12. A medical practitioner may administer medical treatment to a child if—

   (a) the parent or guardian consents; or

(b) the child consents and—

i. the medical practitioner who is to administer the treatment is of the opinion that the child is capable of understanding the nature, consequences and risks of the treatment and that the treatment is in the best interest of the child's health and well-being; and

ii. that opinion is supported by the written opinion of at least one other medical practitioner who personally examines the child before the treatment is commenced.

A.2 Age of majority laws

A.2.1 Age of majority for general purposes: state by state

Every state and major territory has its own age of majority law (hereafter AoM) setting the age of majority at 18 years old. Table 1 gives the dates when each law was proposed and came into force ("commenced"). Two states (New South Wales and South Australia) have separate minimum ages for medical consent that are comparable to AoM laws.

A.2.2 Age of majority for medical consent in New South Wales in 1971

In addition to setting 18 as the AoM, the *Minors (Property and Contracts) Act 1970 (NSW)* allowed doctors to presume that children over 14 could give consent for medical treatments. Section 49 states

> Where medical treatment. . . of a minor aged fourteen years or upwards is carried out with the prior consent of the minor, his or her consent has effect in relation to a claim by him or her for assault or batter in respect of anything done in the course of that treatment as if, at the time when the consent is given, he or she were aged twenty-one years or upwards.

Note that this provides protections to medical practitioners but in no way guarantees a right for children to make their own medical choices (New South Wales Law Reform Commission, 2008. Whether this law resulted in doctors extending that right to children is an empirical and historical question. If, however, doctors simply relied on the common law rules outlined above, then the proportion of minors who could choose to get contraceptives would likely be lower than if 14-year-olds were treated as adults under this law. Note also that this law was designed specifically to allow minors to give consent, so its exogeneity is suspect.

A.2.3 Age of majority for medical consent in South Australia in 1987

The *Consent to Medical and Dental Treatment Act 1985 (SA)* 1985 (assented to 14 March 1985, commenced 1 May 1987: Gaz. 30 April 1987, p. 1115) specified that

6. 6.

(a) 1. The consent or the refusal or absence of consent of a minor who is of or above the age of sixteen years in respect of a medical procedure or dental procedure to be carried out on the minor or any other person has the same effect for all purposes as if the minor were of full age.

(b) 2. The consent of a minor who is less than sixteen years of age in respect of a medical procedure or dental procedure to be carried out on the minor has the same effect for all purposes as if the minor were of full age where, in the opinion of a medical practitioner or a dentist supported by the written opinion of one other medical practitioner or dentist, as the case may be—

i. a. the minor is capable of understanding the nature and consequences of the procedure; and

ii. b. the procedure is in the best interests of the health and well-being of the minor.

Again the *Consent to Medical Treatment and Palliative Care Act 1995 (SA)* 1995 updated the rules:

1. 6. A person of or over 16 years of age may make decisions about his or her own medical treatment as validly and effectively as an adult.

A.3 Abortion laws

Allowances for abortion in Australia take on five possible forms:

1. Did the pregnant woman give informed consent?
2. Would terminating the pregnancy decrease the risk to the wellbeing of the patient (the pregnant woman)? This condition does not specify that the risk must be beyond that of a typical pregnancy.
3. Does the pregnancy pose a serious danger to the patient (this does not include the dangers of a typical pregnancy, although sometimes the phrase "serious danger" is used in both conditions 2, 3, and 4), and would terminating the pregnancy likely reduce this danger?
4. Is terminating the pregnancy immediately necessary to preserve the life of the patient?
5. If the pregnancy continues, is there a high probability that the child will suffer from some severe abnormality or handicap?

All states allow abortions for reason 4. Until recently, only Western Australia considered reason 1 a sufficient defense.

A.3.1 Northern Territory

In the Northern Territory, the Medical Services Act allows for abortions

- before 14 weeks if "the continuance of the pregnancy would involve greater risk to her life or greater risk of harm to her physical or mental health than if the pregnancy were terminated" or
- before 23 weeks if "termination of the pregnancy is immediately necessary to prevent serious harm to [the mother's] physical or mental health" or
- any time if the intent of the abortion is to preserve the life of the mother.

Only women over age 16 are allowed to consent under the law. Abortions for reasons other than preventing serious harm to the mother must be performed in hospitals.

Were these conditions added in 2006? Before that did the *Criminal Code Act* rule?

A.3.2 Victoria

In Victoria, the Crimes Act 1958 specified that it was a crime (a felony and later in 2006 an indictable offense) to "unlawfully" terminate a pregnancy, but it was left up to courts to decide what constituted an unlawful abortion (Victorian Law Reform Commission, 2008, Victorian Law Reform Commission, 2007).

The 1969 Menhennitt ruling in *R v Davidson* specified that abortion could be lawful if it were "necessary to preserve the woman from a serious danger to her life or her physical or mental health (not being merely the normal dangers of pregnancy and childbirth)" (Victoria Law Reform Commission, 2008) (SHOULD CITE THE ORIGINAL CASE).

The *Abortion Law Reform Act 2008* (Vic) removed almost all legal restrictions on abortion, allowing a medical practitioner to "perform an abortion on a woman who is not more than 24 weeks pregnant" or to perform an abortion after 24 weeks when at least two medical practitioners agree that the abortion is appropriate.

A.3.3 New South Wales

R v Wald 1972 specified rules similar to the 1969 Menhennitt ruling in *R v Davidson* (Vic) but elaborated on the conditions slightly. For the purpose of this research, the difference is negligible.

Wald was upheld in *CES v Superclinics (Australia) Pty Ltd*. One of the appeals court judges stated that the standard of harm to the mother that would justify abortion should include harm that might occur after pregnancy due to not terminating the pregnancy.

A doctor was convicted of unlawful abortion in NSW in 2006 (*R v Sood* because she did not discuss the possible costs to the patient of not terminating her pregancy (and thus could not have knowledge about how the Menhennitt rules applied to her patient).

A.3.4 High Court of Australia

Member of the High Court of Australia spoke favorably of the *CES* (NSW) decision in Harriton v Stephens (2006) 80 ALJR 791.

A.3.5 Queensland

As in Victoria and New South Wales, Queensland allows abortions only to protect the life or wellbeing of the mother, but in 1986 a judge specified that only medical protections for the mother were a valid defense (*R v Bayliss & Cullen* 1986). The state has not prosecuted any doctors for abortions since that ruling (Victorian Law Reform Commission, 2008).

A.3.6 Western Australia

A.3.7 Tasmania

Tasmania allows abortions in cases where not terminating the pregnancy is more dangerous than terminating it (*Criminal Code Act 1924 (Tas)* 1924). This condition was added to the law in 2001, but it is unclear whether doctors would have interpreted the previous wording as allowing such abortions. Because bans against "unlawful" abortions in other states have been interpreted more narrowly than this, it is likely that doctors in Tasmania would have expected that Tasmania's ban on "unlawful" abortions prevented them from giving abortions in cases where there was no immediate threat to the mother (until the clarification in 2001). (*Criminal Code Amendment Act (No. 2) 2001 (No. 123 OF 2001) (Tas)* 2001 - *SECT 4*)

Criminal Code Act 1924 (Tas) 1924:

1. 51. Surgical operations
   (a) (1) It is lawful for a person to perform in good faith and with reasonable care and skill a surgical operation upon another person, with his consent and for his benefit, if the performance of such operation is reasonable, having regard to all the circumstances.
   (b) (1A) Subject to section 149, and despite subsection (1), a termination can be lawfully performed on a woman by a medical practitioner if it is performed in good faith, with reasonable care and skill and with the woman's consent
2. 178E. Termination without woman's consent
   (a) (2) No prosecution is to be instituted against a medical practitioner who performs a termination on a woman if the woman is incapable of giving consent and the termination is —
      i. (a) performed in good faith and with reasonable care and skill; and
      ii. (b) is for the woman's benefit; and
      iii. (c) is reasonable having regard to all the circumstances.
3. 164. Medical termination of pregnancy
   (a) (1) Notwithstanding anything contained in section 134, 135 or 165, but subject to this section, a person is not guilty of a crime in relation to the termination of a pregnancy which is legally justified.
   (b) (2) The termination of a pregnancy is legally justified if —
      i. (a) two registered medical practitioners have certified, in writing, that the continuation of the pregnancy would involve greater risk of injury to the physical or mental health of the pregnant woman than if the pregnancy were terminated; and
      ii. (b) the woman has given informed consent unless it is impracticable for her to do so.
   (c) (3) In assessing the risk referred to in subsection (2), the registered medical practitioners may take account of any matter which they consider to be relevant.

A.3.8 South Australia

South Australia differs from Victoria, NSW, and Queensland (and probably Tasmania and Western Australia) in that abortion is allowed in SA if "continuing the pregnancy would involve *greater* risk of injury to the physical or mental health of the woman, or involve *greater* risk to the life of the woman than termination" (Criminal Law Consolidation Act 1935, emphasis added; this was a 1969 amendment—commencing when?—based on English common law) or to end pregnancies where the child would likely "suffer from such physical or mental abnormality as to be seriously handicapped". Although the standard here is to compare the risk of continuing the pregnancy to not continuing the pregnancy, and the standard in the previously-discussed states is to compare the risk of continuing the pregnancy to the risk of a typical pregnancy, in practice the two standards are often treated similarly by medical practitioners. A patient must have lived in SA for at least two months before the abortion unless the abortion is needed to preserve the life of the patient or due to some serious expected abnormality of the child. Abortions are generally only allowed after 28 weeks to preserve the life of the mother.

Also unlike other states, South Australia has reporting requirements and publishes abortion statistics.

A.3.9 Australian Capital Territory

Abortion was decriminalized in the ACT in 2002 with the *Crimes (Abolition of Offence of Abortion) Act 2002 (ACT)* 2002.

A.3.10 What constitutes a "serious danger to... life or... physical or mental health"?

The lack of abortion prosecutions in recent decades throughout Australia suggests that either patients do not seek unlawful abortions, that doctors turn them down, that prosecutors neglect abortion cases, or that "danger" to the patient is interpreted liberally by medical practitioners. This last interpretation seems to be a good description of the world. Even in states with seemingly narrow statutes there is de facto legalization because the law leaves evaluation of the patient's care to the doctor. In actual applications, a doctor must speak with a patient about the dangers of not terminating a pregnancy and then may specify any non-common medical danger as justification for the termination.

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