

Compatibility in personalities and non-cognitive skills and relationship dissolution in Australia

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Objectives

- We study the impacts on marital dissolutions of two important determinants of lasting (or otherwise) relationships: (1) spouses' compatibility in personality and non-cognitive skills, and (2) the risks imposed by problem gambling.
- To
 - Provide more evidence on assortative mating and shed lights on the sources of returns to marriages
 - Quantify the impacts of the risks of spouses engaging in problem gambling

Assortative mating and two offsetting sources of returns to marriages

- Production complementarity (Becker, *A Treatise on the Family*, 1981)
 - Division of labour and within household trade---Negative assortative mating (in wages)
- Consumption complementarity (Lam, *JHR*, 1988)
 - Consumption of household common good --- positive assortative mating (in wages)

The rest of talk

- Background
- Data
 - Personality traits and Locus of control
 - Estimated the risk of engaging in problem gambling
- Approach
 - A joint model of marriage and birth durations with nonparametric duration dependence, time-varying explanatory regressors, and unobserved heterogeneity
- Results
- Conclusions

Marriage and divorces in Australia

- Australia follows the global trend:
 - Marriages are less common
 - People marry later and later
 - However, marriages last longer and the rate of divorce declined since 2000 (reversing the trend in the period before)
- In Australia, the average marriage duration to divorce (not including the period of cohabiting) was about 12.2 years in 2021
- Most couples (80.8%, in 2016) cohabitated before marriage
- Annual divorce rate is about 2.2 per thousand population

Figure 1. Crude marriage rates in selected countries (marriages per 1,000 people)

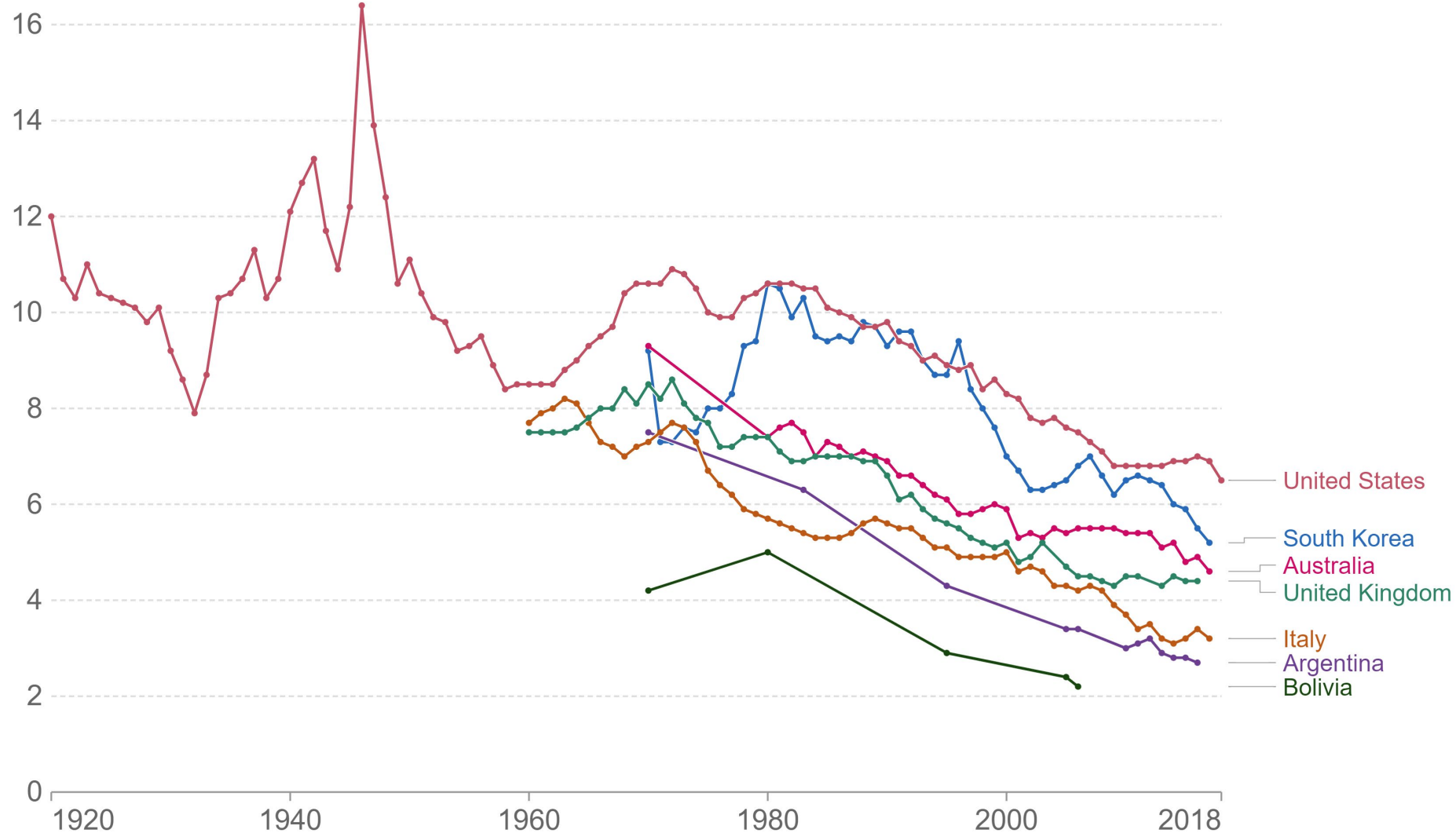
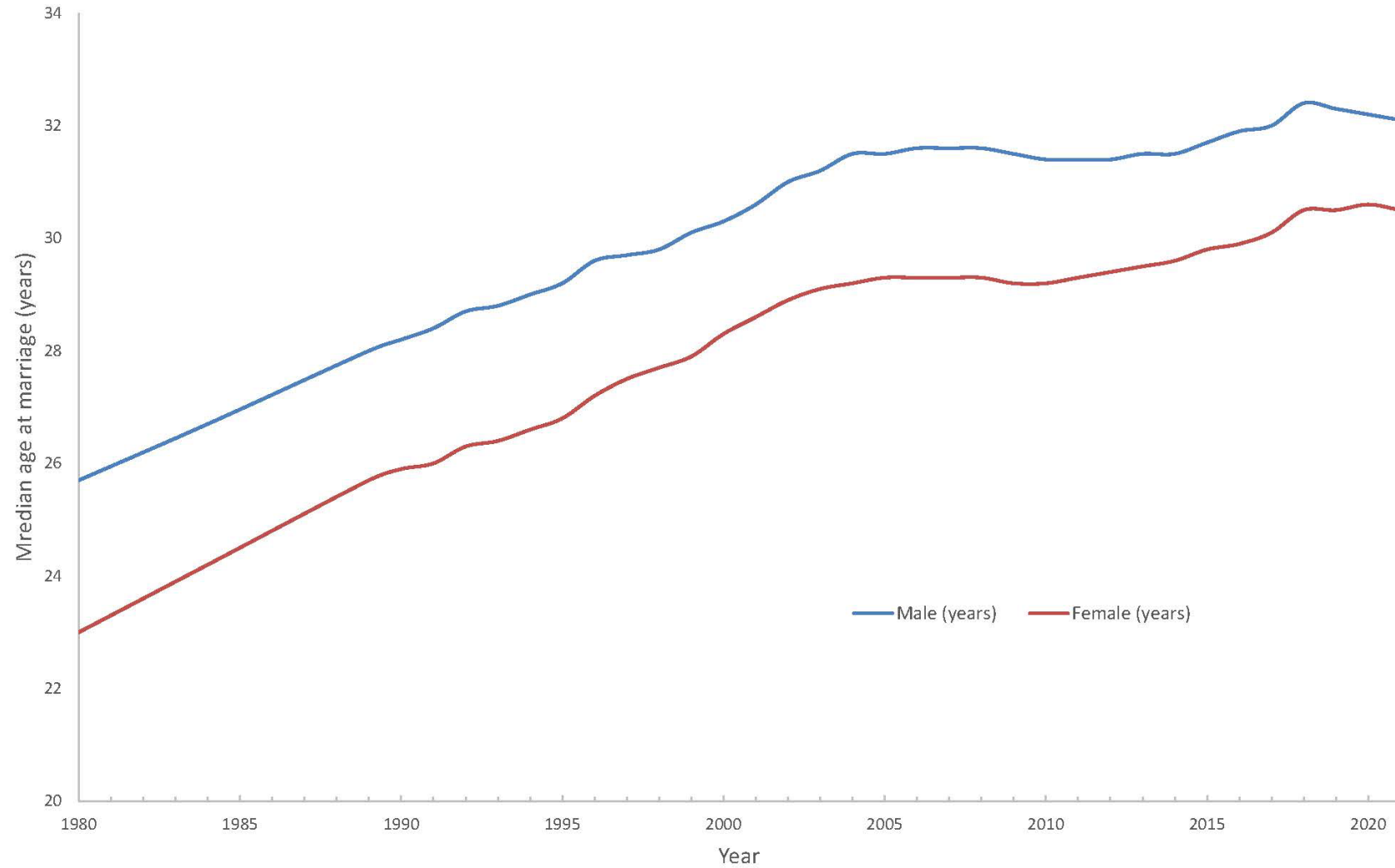
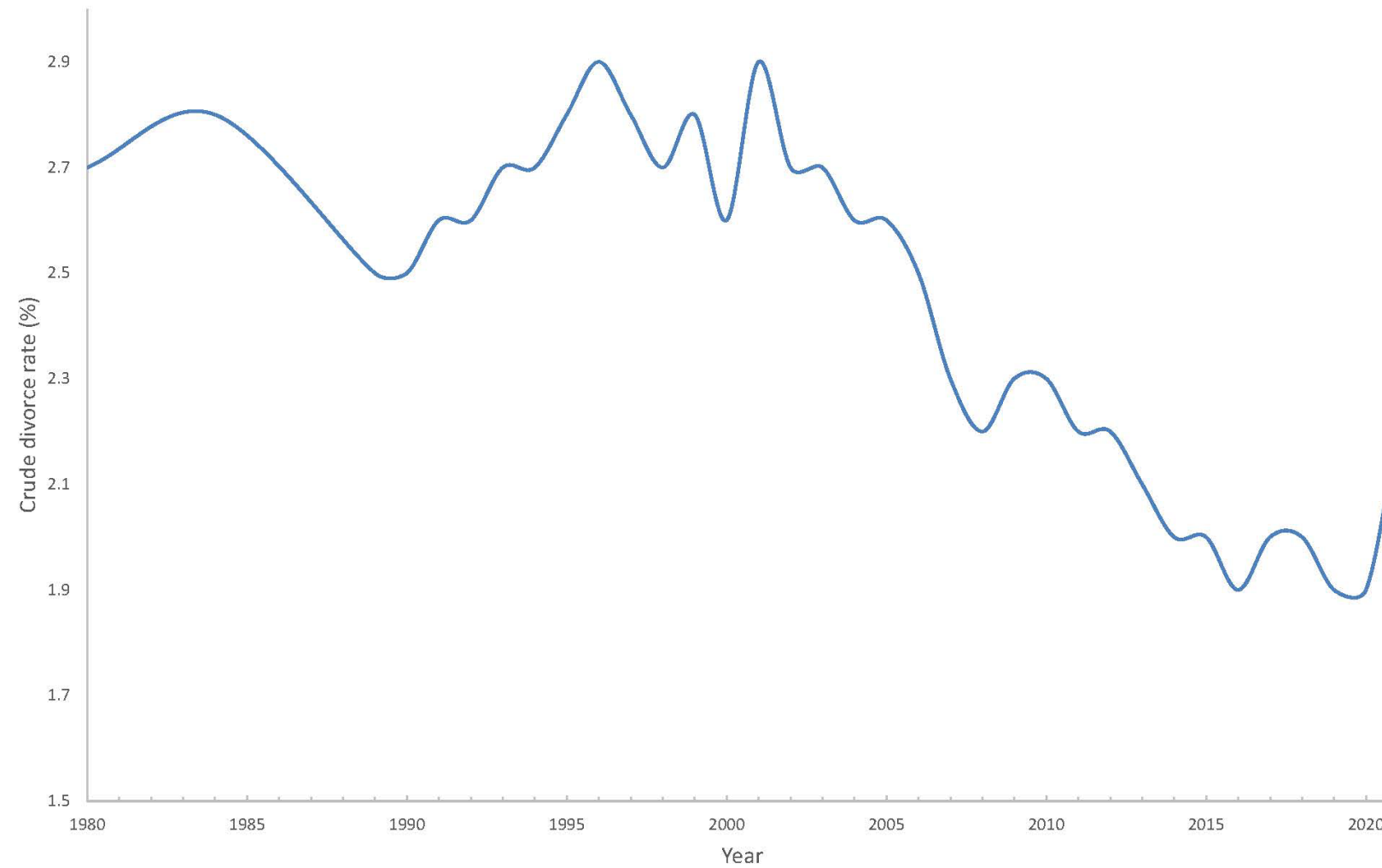


Figure 2. Median age at marriage by sex (1980-2021 Australia)



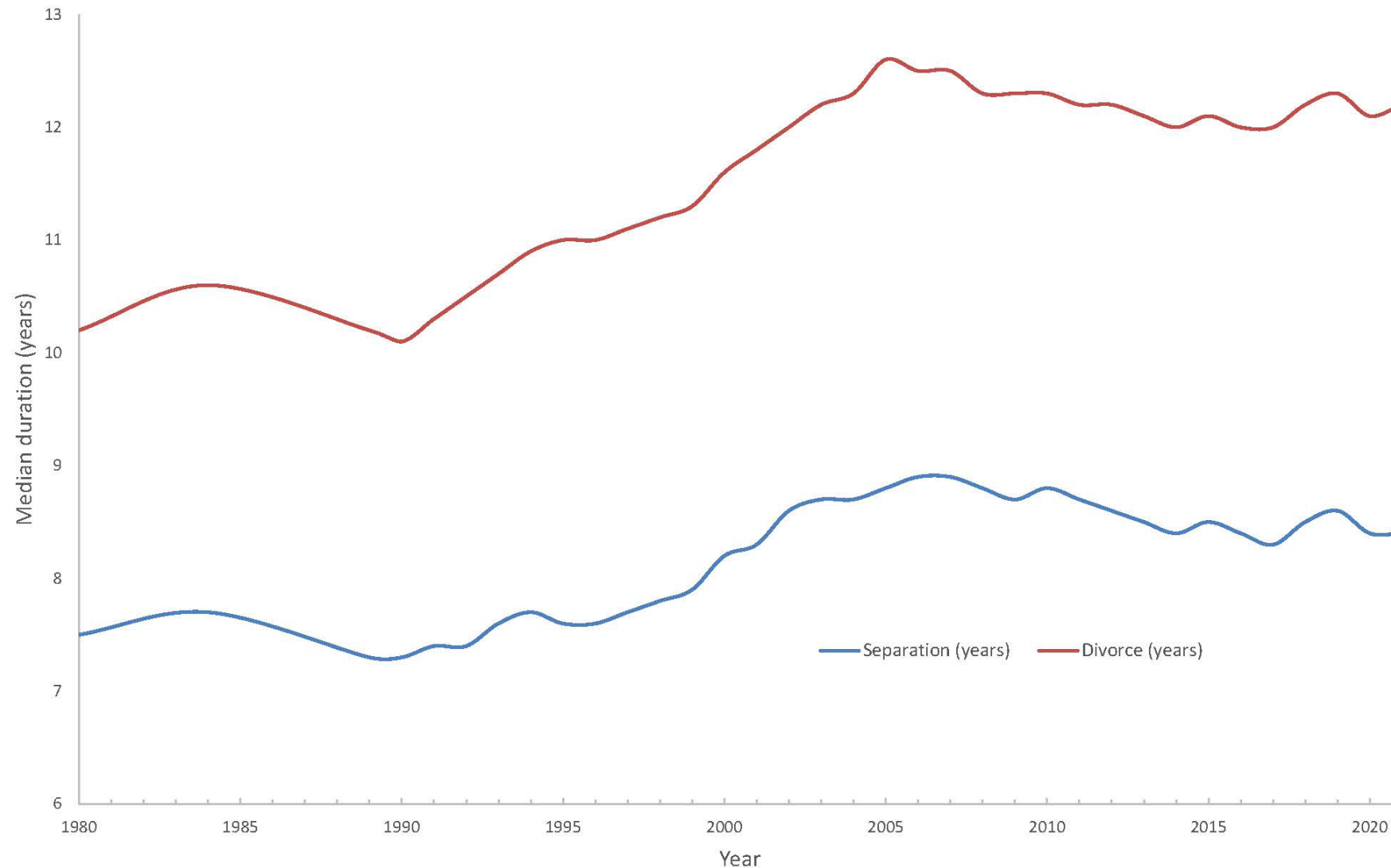
Source: Australian Bureau of Statistics, Marriages and Divorces, Australia (various years)

Figure 3. Crude divorce rate in Australia 1980-2021



Source: Australian Bureau of Statistics, Marriages and Divorces, Australia (various years)

Figure 4. Median duration to divorce and separation (1980-2021 Australia)

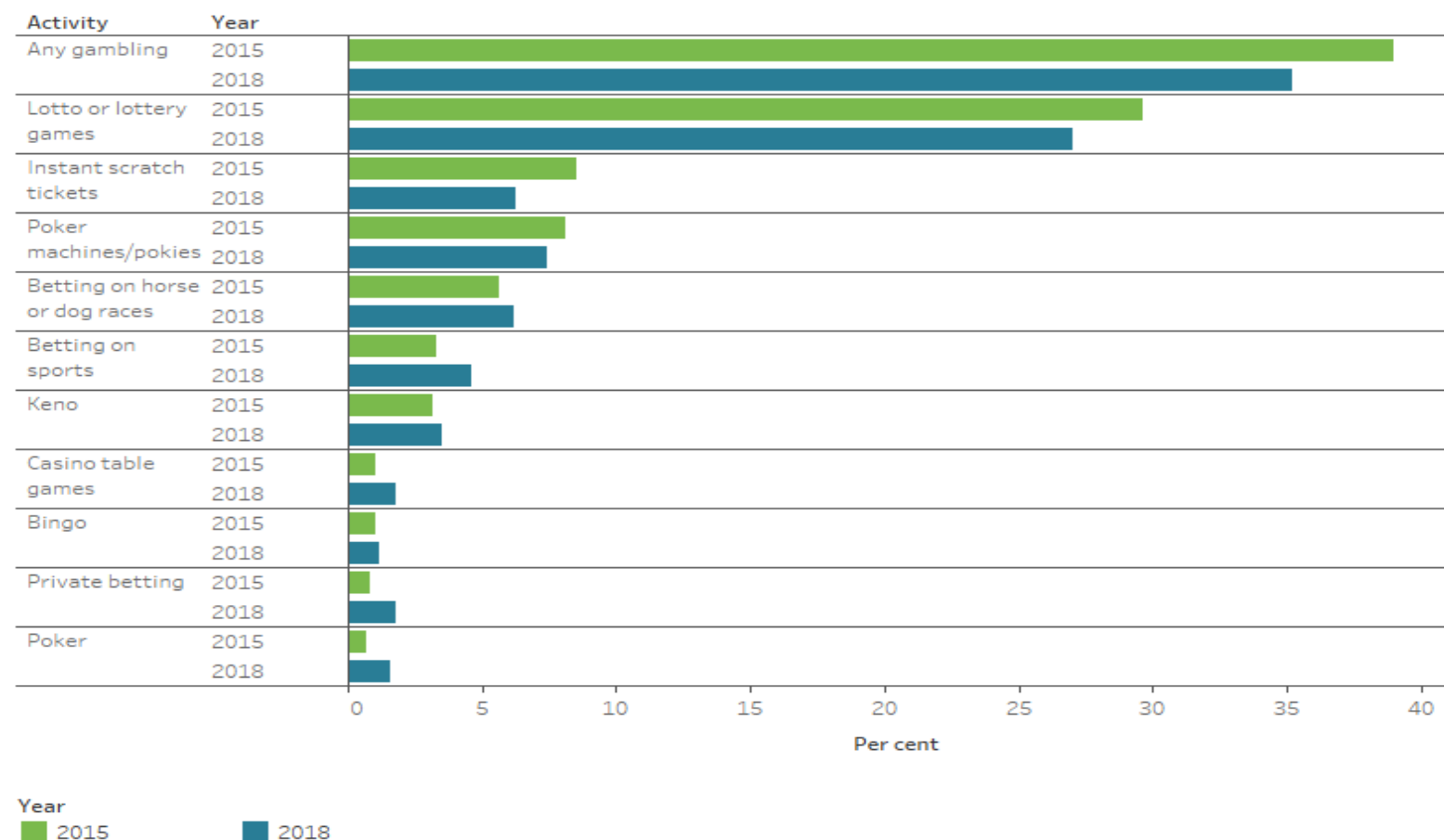


Source: Australian Bureau of Statistics, Marriages and Divorces, Australia (various years)

Gambling in Australia

- Gambling is common in Australia (around 35% of 18+ individuals participate in gambling activities in a typical month)
- A sizable fraction of individuals are classified as being at some risk of experiencing gambling-related problems or 'problem gamblers' (7.9%, in 2015)

Figure 5. Proportion of Australian adults who spent money on gambling activities in a typical month, 2015 and 2018



Notes

1. * Denotes significant difference in participation between 2015 and 2018.
2. Estimations use the Self-completion Questionnaire (SCQ) weighting values provided in the HILDA Survey dataset.
3. Gambling activities include instant scratch tickets ('scratchies'); bingo; lotto or lottery games, like Powerball or Oz Lotto; Keno; private betting (for example, playing cards or mah-jong with friends or family); poker; casino table games (for example, blackjack, roulette); poker machines ('pokies') or slot machines; betting on horse or dog races (but not sweeps); and betting on sports.

Sources: HILDA Wave 15, 2015; Hilda Wave 18, 2018.

<http://www.aihw.gov.au/>

Data

- Twenty waves from the Household, Income and Labour Dynamics in Australia (HILDA) Survey
 - Information on gambling in Wave 15 and 18
 - Information on noncognitive skills (locus of control) in Waves 3 , 4, 7, 11, and 19
 - Information on personality attributes (Big Five personality traits) in Waves 5, 9, 13, and 17
- The sample:
 - **11,617** marriage episodes that started after 1955, with both partners observed at least once in the Survey and born after 1930, and the **29,148** birth episodes within these marriage episodes.

Personality traits and Locus of control

- Big five personality traits
 - Extraversion
 - Agreeableness
 - Openness
 - Conscientiousness
 - Emotional stability (negative Neuroticism)
- A measure of noncognitive skills
 - Locus of control

Figure 6. Durations of the relations

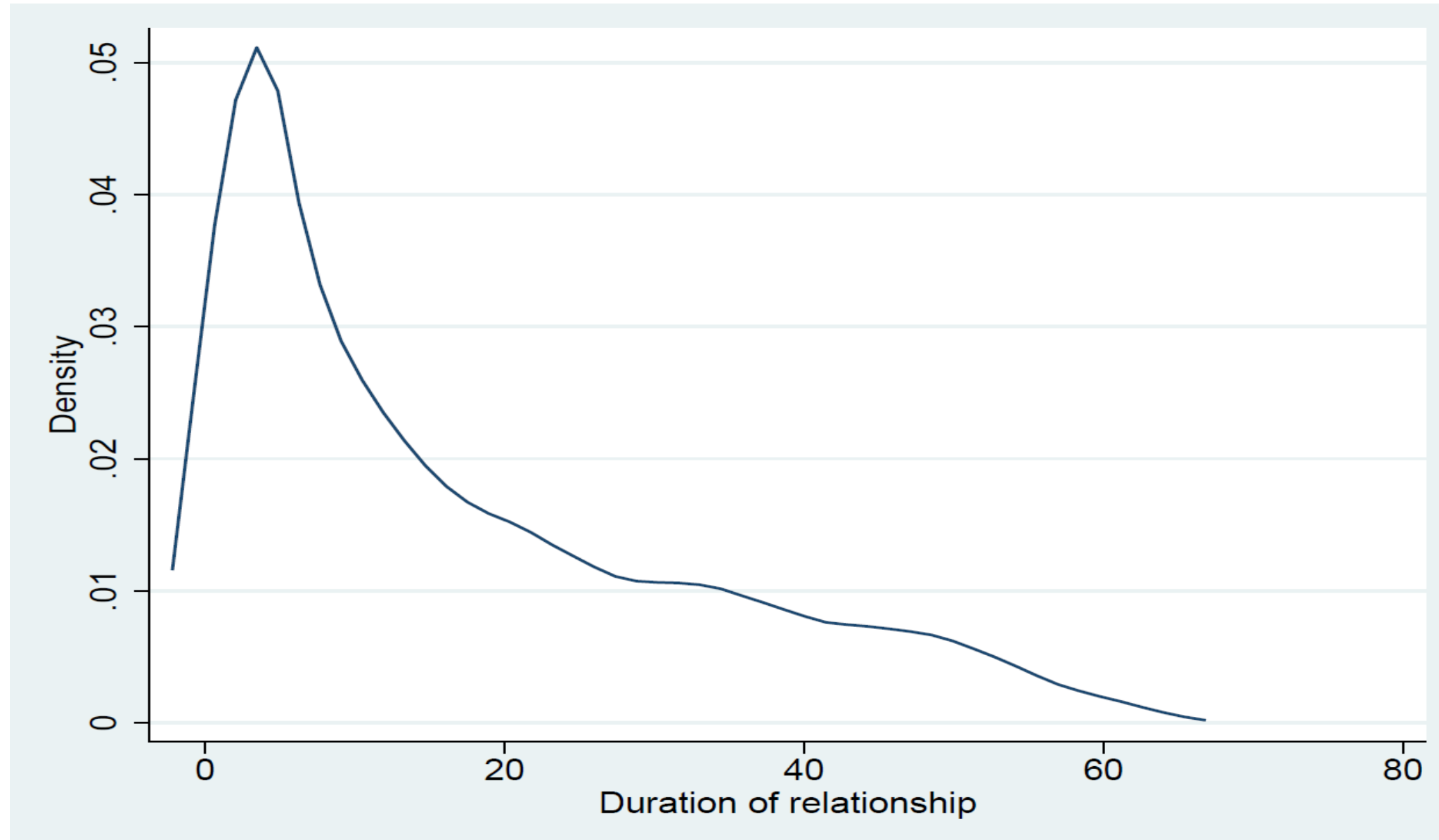


Table 1. Sample statistics

Variables	Total		Dissolved		Continuing	
Duration	16.924(15.68)		12.042(13.94)		18.861(15.9)	
No. of children	1.551(1.55)		1.216(1.50)		1.684(1.55)	
	Spouse characteristics					
	Males	Females	Males	Females	Males	Females
LoC	-.082(0.84)	-.034(0.87)	.054(0.89)	.079(0.91)	-.136(0.82)	-.079(0.85)
Extrav.	-.065(0.79)	.107(0.90)	-.067(0.79)	.137(0.92)	-.064(0.79)	.096(0.90)
Agreeable.	-.183(0.82)	.220(0.77)	-.233(0.87)	.194(0.84)	-.163(0.80)	.230(0.75)
Emot. stability	-.019(0.82)	-.070(0.88)	-.121(0.85)	-.180(0.94)	.021(0.80)	-.027(0.85)
Consc.	-.030(0.81)	.088(0.88)	-.115(0.84)	-.023(0.92)	.003(0.80)	.132(0.86)
Openness	.042(0.80)	-.012(0.86)	.056(0.87)	.047(0.92)	.037(0.78)	-.036(0.83)
Indigenous	.028	.031	.042	.047	.022	.025
Having a religion	.477	.408	.469	.382	.480	.469
Lone par. age 14	.124	.136	.158	.175	.111	.120
Parent divorced	.092	.102	.113	.118	.084	.096
Tertiary	.232	.286	.159	.225	.261	.311
Vocational edu	.385	.298	.407	.344	.376	.280
Year 12	.114	.130	.128	.133	.109	.129
Low edu	.208	.254	.255	.274	.189	.245
Previous relation	.370	.341	.450	.429	.338	.306
Had kids before	.521	.515	.628	.669	.478	.454

Standard deviations are in the parentheses.

Table 2. Compatibility in spouse characteristics

Variables	Total	Dissolved	Continuing
Differences in spouse characteristics			
Δ Loc. control	-0.048(1.02)	-0.024(1.11)	-0.057(0.98)
Δ Extrav.	-0.172(1.20)	-0.203(1.21)	-0.160(1.19)
Δ Agreeable.	-0.403(1.06)	-0.427(1.15)	-0.393(1.03)
Δ Emot. stability	0.051(1.06)	0.058(1.13)	0.048(1.04)
Δ Consc.	-0.118(1.12)	-0.092(1.16)	-0.129(1.11)
Δ Openness	0.055(1.05)	0.009(1.12)	0.073(0.83)
Large Δ Extrav.	0.106	0.104	0.107
Large Δ Agreeable.	0.083	0.098	0.076
Large Δ Emot. stability	0.067	0.077	0.063
Large Δ Consc.	0.085	0.087	0.085
Large Δ Openness	0.066	0.076	0.062
Δ Age	2.371(4.96)	2.409(5.45)	2.356(4.75)
Large Δ age (-)	0.259	0.268	0.255
Large Δ age (+)	0.284	0.309	0.274
Education comb Tert.-Tert.	0.140	0.084	0.162
Education comb Tert.-Non T.	0.092	0.075	0.099
Education comb Non T.-Tert.	0.147	0.141	0.149
Education comb Non T.-Non T.	0.621	0.700	0.590
Same 2nd language	0.064	0.032	0.076
No 2nd language	0.781	0.793	0.777
No. of relationships	11,617	3,300	8,317

Standard deviations are in the parentheses.

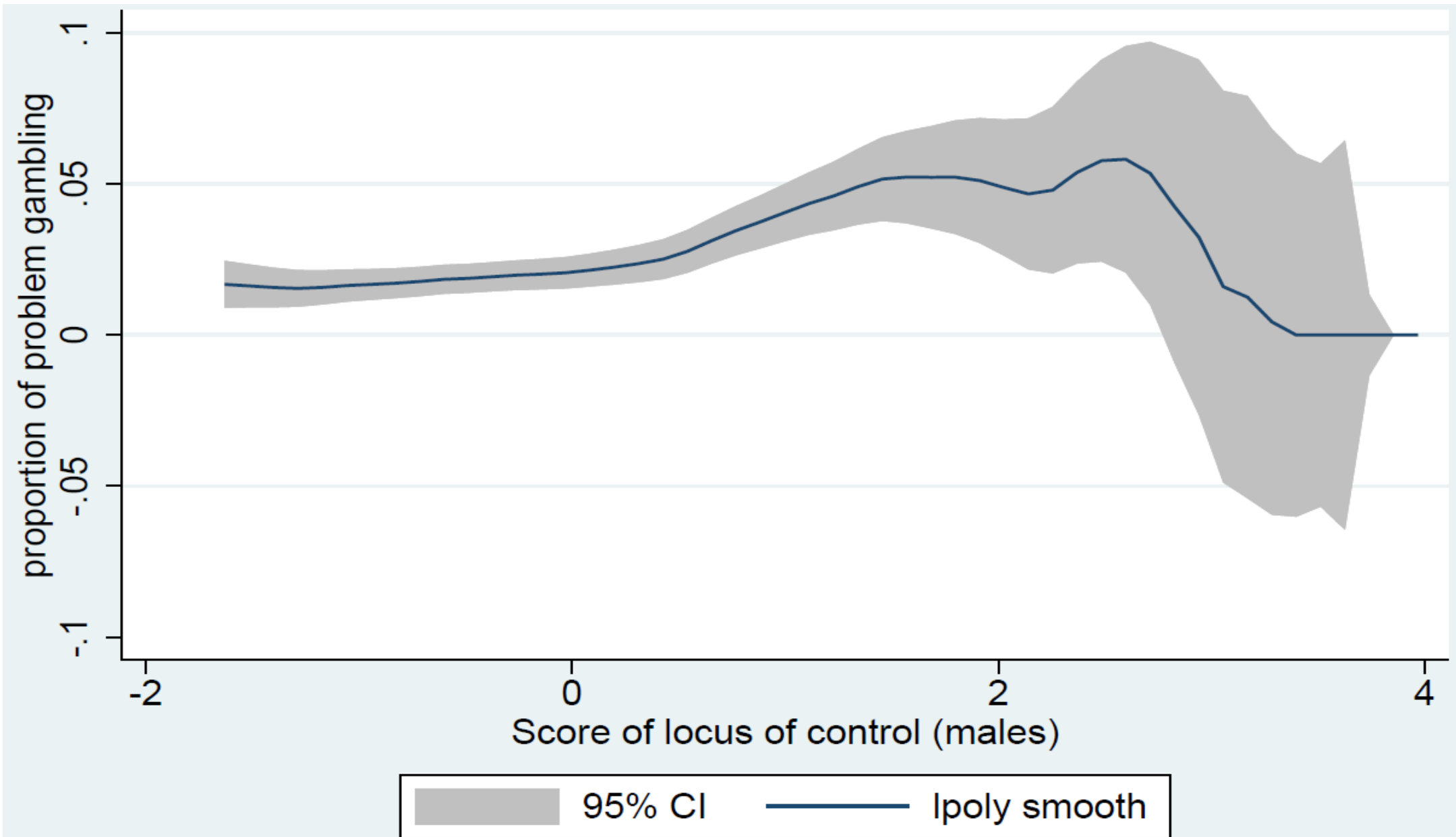
Table 4. Correlation of partners' personality and non-cognitive skills

Variables	Total	Dissolved	Continuing
Loc. of control	0.294	0.236	0.312
Extrav.	0.009	0.009	0.008
Agreeable.	0.112	0.102	0.115
Emot. stability	0.212	0.203	0.209
Consc.	0.121	0.140	0.105
Openness	0.199	0.218	0.189

Table 5. Selected estimates of the gambling equations

Variables	Gambling		Problem gambling	
	Females	Males	Females	Males
Education				
Tertiary	-.136***	-.021	-.172**	-.187***
Vocational	.115***	.168***	.095	.093*
Low edu	.103***	.076**	.163**	.137**
Religion				
Buddhism	.018	.158		
Christian	.125***	.135***		
Hindu	.223*	.141		
Islam	-.439***	-.416***		
Other	.015	.069		
Personality and non-cognitive skills				
Loc. control	-.437***	-.852***	.292**	-.067
Extrav.	.008	.026**	.063**	.064***
Agreeable.	.054***	.023*	-.035	.018
Emot. stability	-.125***	-.120***	-.194***	-.204***
Consc.	.023*	.020	-.077***	-.067***
Openness	-.083***	-.085***	-.008	-.040*
Birth Country				
Europe/N. America	-.101***	.011	.040	-.097
Mid. East	-.527***	-.098	.157	.203
SE. Asia	-.033	-.163**	.296***	.094
E. Asia	-.377***	-.208	.312**	-.130
S. Asia	-.210**	-.080	.089	.059
Other	-.198***	-.028	.039	.036
Indigenous status and family background				
Indigenous	.007	.106	.473***	.319***
Parent divorced	.059*	.071**	-.012	.221***
Lone parent at 14	.035	.046	.046	.153***

Figure 7. Problem gambling and locus of control (males)



kernel = epanechnikov, degree = 0, bandwidth = .38, pwidth = .56

The model (1)

A joint model of marriage and birth processes (similar to Lillard, J. of Econometrics, 1993):

- Hazard of marriage:

$$\log h_r^d(t) = \alpha_0 + \alpha'_1 C(t) + \alpha'_2 A(t) + \alpha'_3 M_r(t) + \alpha'_5 Z^d(t) + \alpha'_6 K_r(t) + \epsilon \quad (1)$$

- Hazard of birth

$$\log h_{rb}^k(t) = \beta_0 + \beta'_1 C(t) + \beta'_2 A(t) + \beta'_3 M_r(t) + \beta'_4 L_{rb}(t) + \beta'_5 Z^k(t) + \eta \quad (2)$$

where

- C , A , M_r , and L_{rb} are piecewise linear spline functions of t , e.g.,

$$M_r(t) = \left(M_{r,1}(t), \dots, M_{r,N_M+1}(t) \right), M_{r,s}(t) = \max[0, \min(t - \mu_{s-1}, \mu_s - \mu_{s-1})], \text{ and } \mu_s \text{ (s=1,..., } N_M) \text{ are the 'nodes'}$$

(Thus, the baseline hazard at t is a piecewise linear Gompertz.)

- The unobserved heterogeneity ϵ and η follow a joint normal distribution

Estimation (1)---Survival functions

- Baseline survival functions

- For marriage episode r at $t > t_{0r}^d$:

$$S_{0r}^d(t) = \exp\left\{-\int_{t_{0r}^d}^t \exp\{\alpha_0 + \alpha'_1 C(\tau) + \alpha'_2 A(\tau) + \alpha'_3 M_r(\tau)\} d\tau\right\} \quad (3)$$

- For birth episode b in marriage episode r at $t > t_{0rb}^k$

$$S_{0rb}^k(t) = \exp\left\{-\int_{t_{0rb}^k}^t \exp\{\beta_0 + \beta'_1 C(\tau) + \beta'_2 A(\tau) + \beta'_3 M_r(\tau) + \beta'_4 L_{rb}(\tau)\} d\tau\right\} \quad (4)$$

- Survival functions conditional on observables (the full history of which denoted by $\chi(t)$) and unobservables are

- $S_r^d(t, \chi(t), \epsilon) = \prod_{i=1}^{I_r} \left[\frac{S_{0r}^d(t_{i,r}^d)}{S_{0r}^d(t_{i-1,r}^d)} \right]^{\exp(\alpha'_5 Z^d(t_{i,r}^d) + \alpha'_6 K_r(t_{i,r}^d) + \epsilon)}, \quad (5)$

and

- $S_{rb}^k(t, \chi(t), \eta) = [S_{0rb}^k]^{\exp(\beta'_5 Z^k(t) + \eta)} \quad (6)$

Estimation (2)---Simulated ML

- Likelihood for the spells:

$$Lik^p(s|\pi) = \begin{cases} S_s^p(t) & \text{if the spell is censored at } t \\ S_s^p(t) \cdot h^p(t) & \text{if the spell is not censored at } t. \end{cases} \quad (7)$$

where $p = d, k$, $s = r, rb$, and $\pi = \epsilon, \eta$.

- Likelihood function for a woman i

$$L_i = \iint_{\epsilon, \eta} f(\epsilon, \eta) \prod_{r=1}^R Lik^d(r|\epsilon) \prod_{rb=1}^{RB} Lik^k(rb|\eta) d\epsilon d\eta \quad (8)$$

- Simulated by the average of M likelihood values conditional on random draws from the joint distribution of ϵ and η :

$$L = 1/M \sum_{m=1}^M \prod_{r=1}^R Lik^d(r|\epsilon^m) \prod_{rb=1}^{RB} Lik^k(rb|\eta^m) \quad (9)$$

Results

Table 6. Estimated log hazard equation (marriage dissolution)

Duration effects Relationship		Difference in Partners' Char.		Characteristics	
0-1	-0.753*** (0.172)	Large age diff (+)	0.210*** (0.070)	Prop. Pg(f)	0.285*** (0.077)
1-4	-0.009 (0.022)	Large age diff (-)	0.232*** (0.070)	Prop. Pg(m)	0.030 (0.078)
4-20	0.005 (0.009)	Diff. Loc (+)	0.271*** (0.055)	LoC (f)	0.261*** (0.052)
20+	0.065*** (0.008)	Diff. Loc (-)	0.116** (0.059)	Extrav.(f)	0.261*** (0.052)
<u>Age</u>					
14-20	0.029 (0.077)	Diff. Extrav. (+)	0.039 (0.056)	Agreeable (f)	0.033 (0.055)
20-30	-0.050*** (0.011)	Diff. Extrav. (+)	0.075 (0.049)	Emo. stab.(f)	-0.006 (0.061)
30+	-0.029*** (0.004)	Diff. Agree. (+)	0.174** (0.071)	Conscientious(f)	-0.041 (0.053)
<u>Time</u>					
-1985	0.038 (0.057)	Diff. Agree. (-)	-0.026 (0.046)	Openness (f)	0.200*** (0.051)
1986-2010	0.061*** (0.012)	Diff. Emo. Stab.(+)	-0.010 (0.063)	Indigenous (f)	0.082 (0.161)
2010+	0.151*** (0.008)	Diff. Emo. Stab.(-)	-0.079 (0.060)	Indigenous (m)	0.152* (0.088)
Constant	-4.577** (2.135)	Diff. Consc. (+)	-0.008 (0.061)	Lang2-same	-0.966*** (0.179)
<u>Kids effects</u>					
kchd	-0.556*** (0.093)	Diff. Consc. (-)	0.030 (0.051)	Eng.-only	-0.082 (0.076)
kchda	-0.359*** (0.060)	Diff. Open. (+)	0.137** (0.055)	Tert(m)-Non(f)	-0.232** (0.110)
		Diff. Open. (+)	-0.013 (0.057)	Non(m)-Tert(f)	-0.191** (0.084)
				Tert(m)-Tert(f)	-0.624*** (0.108)
				Par. divorce (f)	0.152* (0.088)
				Par. divorce (m)	0.201** (0.097)

Significance: *** at 1%; ** at 5%; * at 10%.

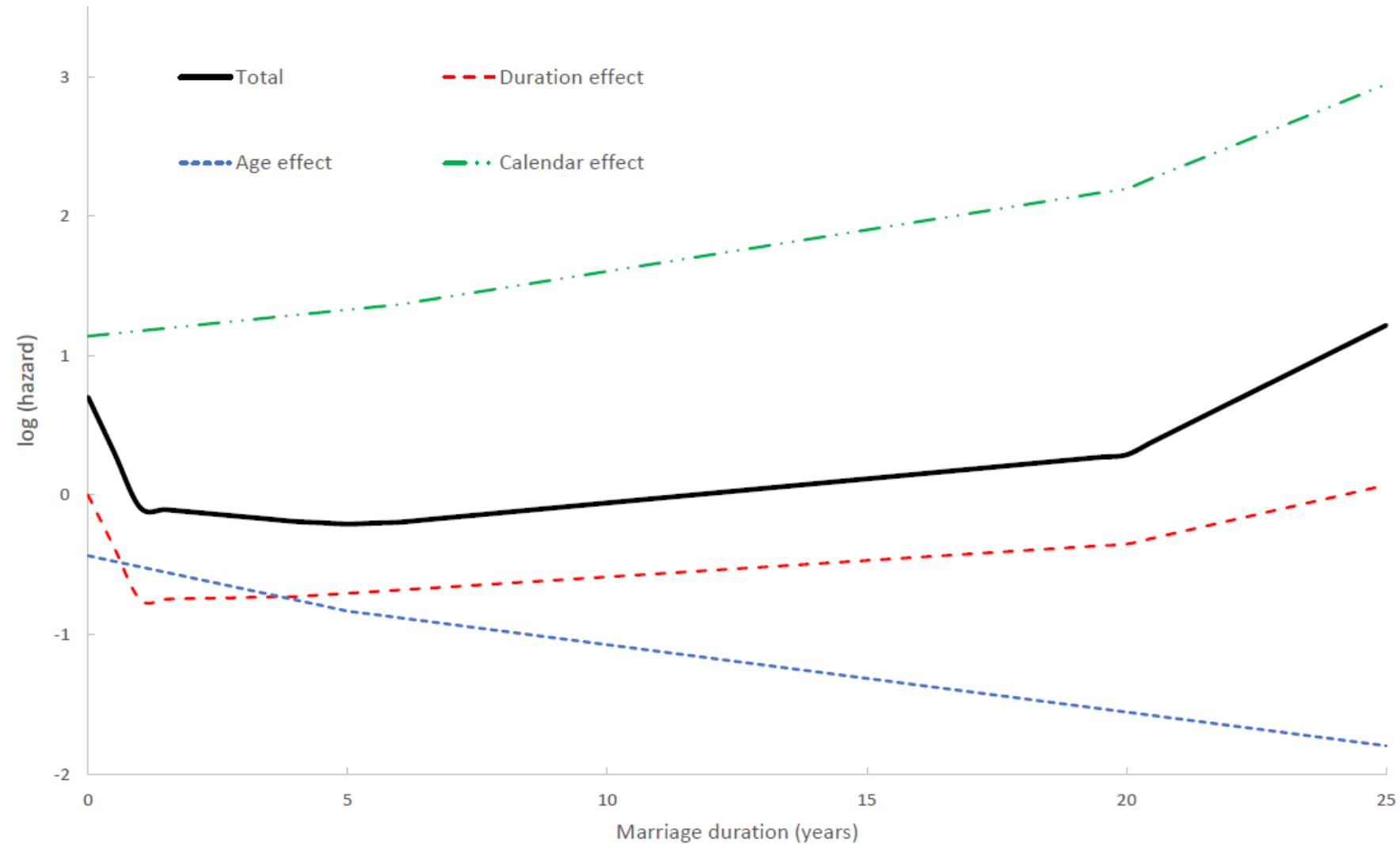
Table 8. Estimated random effects

σ_{ϵ}^2	0.557*** (0.134)
σ_{η}^2	0.023** (0.010)
$\sigma_{\epsilon\eta}$	0.113** (0.055)
$\ln -L$	-31031.7
No. of Records	29,148

Significance:

at 1%; ** at 5%; * at 10%.

Figure 8. Estimated baseline hazard and the contributions of duration, age, and calendar effects (a women started her relation at the at 25 in 1990)



Conclusions

- We estimated a random effect time-varying duration model of relation dissolution joint with partners' problem gambling incidences using data from an Australian panel data (HILDA);
- Partners' compatibility in personality, non-cognitive skills, and other characteristics play important roles in marriages, with asymmetric effects.
- The findings are mostly consistent with positive assortative mating. However, if there is significant transaction or management costs within marriages, Consumption complementarity might not be the only reason for the positive assortative mating. To get more affirmative conclusions, the existing models may need to be extended to include such transaction costs.
- If the partners have a higher risk of engaging in problem gambling, the hazard rate of the marriage is significantly higher.
- Both marriage and birth spells exhibit strong duration dependence on own duration, age, and calendar time. Consistent with the literature, we find that children play an important stabilising role in marriages---this is with the birth equation estimated jointly with the marriage equation and with the unobserved heterogeneity controlled for.